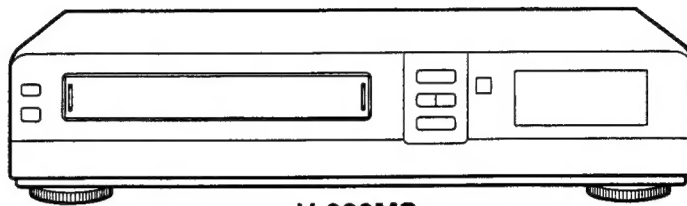


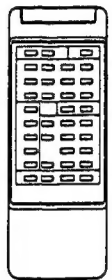
TOSHIBA

COLOR VIDEO CASSETTE RECORDER

V-980MS



V-980MS



SPECIFICATIONS

GENERAL

Video recording system:	Head configuration 2-head rotary
Video signal:	CCIR: 625 lines, 50 field, PAL/SECAM: Color signal
Storage temperature:	-20° to +60°C (-4° to +140°F)
Operating temperature:	5° to 40°C (41° to 104°F)
Antenna:	75-ohms external aerial terminal for UHF
Channel coverage:	CCIR ch: V _L : E2 - E4, V _H : E5 - E12, UHF: E21 - E69, CATV: V _L : X-S1, V _H : S2-S20 OIRT ch: V _L : R1 - R5, V _H : R6 - R12, UHF: E21 - E69 CHINA ch: V _L : C1 - C5, V _H : C6 - C12, UHF: C13 - C57 USA ch: V _L : 2 - 6, V _H : 7 - 13, UHF: 14 - 79, CATV: V _L : 2-A3, V _H : A2-W UHF: 65 - 125 JAPAN ch: V _L : 1-3, V _H : 4 - 12, UHF: 13 - 62, CATV: V _H : M1-S13
AERIAL output signal:	G.I.K. SYSTEM 30 - 39ch (CCIR/OIRT), C22 - C26ch (CHINA), M-SYSTEM J25 - J37ch (JAPAN), US26 - US38ch (USA)
Power requirement:	AC 110 - 240V, 50/60Hz
Power consumption:	23W
Weight:	5.9kg

Dimensions: 430mm x 101mm x 355mm (W/H/D)

VIDEO

Input:	VIDEO LINE IN: Phono-type connector, 1.0V (p-p), 75-ohms unbalanced, sync negative
Output:	VIDEO LINE OUT: Phono-type connector, 1.0V (p-p), 75-ohms unbalanced, sync negative

VIDEO

Signal-to-noise ratio: Better than 43 dB (SP)

AUDIO

Input:	AUDIO LINE IN: Phono-type connector, more than 47 k-ohm, -8 dBs
Output:	AUDIO LINE OUT: Phono-type connector, less than 4.7 k-ohm, -6 dBs
Frequency response:	80 Hz to 10 kHz
Signal-to-noise ratio:	Better than 42 dB

TAPE TRANSPORT

Tape speed:	PAL/MESECAM/SECAM mode: SP: 23.39 mm/sec. LP: 11.70 mm/sec. NTSC mode: SP: 33.35 mm/sec. EP: 11.12 mm/sec.
Maximum recording-time:	PAL/MESECAM/SECAM mode: SP: 240 min. (E-240) LP: 480 min. (E-240) NTSC mode: SP: 160 min. (T-160) EP: 480 min. (T-160)
Fast forward time:	Within 6 min. (E-180)
Rewind time:	Within 6 min. (E-180)

TIMER

24 hour digital indication,
8 programmes/28 days

Caution: Copyright Act 1956 Users of video recording equipment should note that it may be unlawful to record television broadcasts, cinematograph films or video recording without the permission of the relevant copyright owner.

Design and specifications are subject to change without notice.

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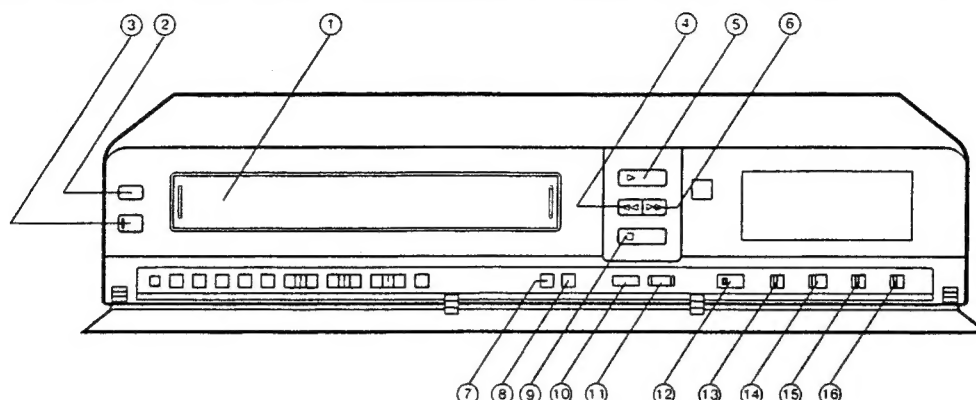
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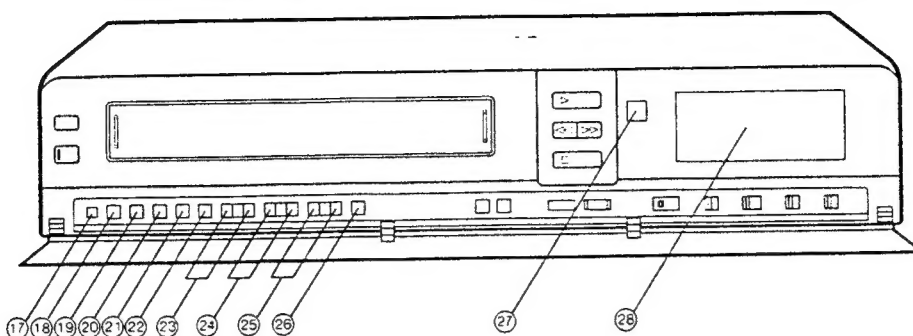
SECTION 1 GENERAL DESCRIPTION

FRONT PANEL



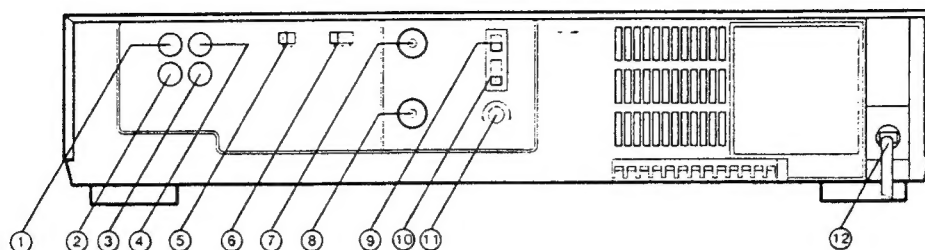
- ① **Cassette Compartment**
Slide the cassette into the unit until the mechanism draws it in automatically.
- ② **EJECT button**
Press this button to remove the cassette when the power is on and off.
- ③ **ON/STANDBY button**
This button is used to turn the VTR on and off.
- ④ **Rewind button (REW)**
Press this button to rewind tapes. During the playback mode, pressing this button will allow you to play tapes in reverse rapidly.
- ⑤ **PLAY button**
Press this button to play back a pre-recorded cassette. The PLAY indicator comes on. Frame advance can be performed while in the still mode.
- ⑥ **Fast forward button (FF)**
Press this button to fast forward the tape. During the playback mode, pressing this button will allow fast forward playback.
- ⑦ **DIGITAL TRACKING button**
Tracking is automatically set for an optimum condition. (Only in the playback mode)
- ⑧ **Recording tape speed select button (SP/LP-EP)**
When set to the SP position, recording in the SP (Standard Play) mode is possible; when set to the LP position, recording in the LP (long play) mode is possible. When in NTSC mode, the recording tape speed is switched between SP and EP.
- ⑨ **STOP button**
Press this button to stop the tape or interrupt the fully-automatic function.
- ⑩ **PAUSE/STILL button**
Used to operate the VTR in three different ways:
A) To temporarily stop the tape in the recording mode.
B) To view a still picture in the playback mode.
C) To advance the picture frame by frame, by using the PLAY button after this button is pressed.
- ⑪ **Recording button (REC)**
This is used for recording.
- ⑫ **VIDEO SYSTEM switch (AUTO/PAL, MESECAM/SECAM/NTSC)**
Used to switch the video system setting positions according to the receiving broadcast systems or the video format of the tape to be played back. Normally place this switch to the "AUTO" position.
- ⑬ **NTSC (3.58/4.43) select switch**
Select NTSC 3.58 or NTSC 4.43 according to a TV set used.
- ⑭ **Picture select switch**
HQ: When recording in this position, enabling distinct picture for recording and playback. We recommend this position for recording.
EDIT: Set in this position when copying.
N/R: For playing back a rental tape.
- ⑮ **COUNTER select switch (PAL, SECAM, MESECAM/NTSC)**
Set this switch according to the video format of the tape used, when using the linear time counter.
- ⑯ **TAPE select switch**
PAL, SECAM, MESECAM mode
Use the E-180 position when using a shorter tape than an E-180 video cassette.
Use the E-240 position when using an E-240 video cassette.
NTSC mode
Use the T-120 position when using a shorter tape than a T-120 video cassette.
Use the T-160 position when using a T-160 video cassette.

FRONT PANEL



- 17 CLOCK SET button**
Used to set or reset the VTR clock. When this button is pressed once, the unit enters the clock set mode. When the button is pressed again after setting the VTR clock, the VTR clock starts to work.
- 18 PRESET button**
Used to preset the channel.
- 19 SKIP button and CFM button**
Used to skip the desired channels in channel presetting. Also used to check the previously inputted programme data. Once this button is pressed, the programme scanning starts to continuously show the contents of the programme on the fluorescent display.
- 20 CLEAR button**
Used to cancel to programming data that has been preset to programme numbers 1 through 8. After pressing the PGM button.
- 21 OTR button and BAND button**
OTR button: Used to perform recording in 30 minute periods in normal mode. (Up to 4 hours)
Used to specify the timer-off time in units of 30 minutes in the timer mode.
BAND button: Used to switch the frequency tables for V_L, V_H, UHF as long as the PRESET button is pressed to ON.
- 22 PGM button**
Used to start programmable timer operation.
- 23 TRACKING/V-LOCK and SET (+)/SET (-) and SEARCH button**
TRACKING button: When this button is pressed in the tape play mode, tracking adjustment is done.
V-LOCK button: When this button is pressed in the still mode, vertical lock adjustment is done.
SET (+) button: This button is used for clock and timer programme setting. The digits counts up by pressing this button.
SET (-) button: This button is used for clock and timer programme setting. The digits counts down by pressing this button.
- 24 PICTURE CONTROL and FINE (-/+) button and SHIFT (-/+) button**
PICTURE (SOFT/SHARP): Use this button to make a playback picture softer or sharper.
FINE (-/+) buttons: Used for channel presetting. When you want to move to a lower channel, use the FINE (-) button to fine tune. Use the FINE (+) button when you want to move to a higher channel for best possible reception.
SHIFT (-/+) buttons: These buttons are used for clock and timer programme settings. Use the SHIFT (+) button to change the setting position to the next. Use the SHIFT (-) button to change the setting position to the previous.
- 25 Channel select button (up and down)**
Use to select the specific channel which you wish to view or record.
Down button (V): When this button is pressed once, the channel digit decreases by one.
Up button (^): When this button is pressed once, the channel digit increases by one.
- 26 TIMER button**
Used to enter the timer mode. To release the timer stand-by mode, press it again.
- 27 Infrared remote control receiver**
This sensor is used for receiving infrared signals from the Remote Control Unit.
- 28 Fluorescent display**
- SEARCH button:** This button is used for channel presetting. The tuning channel moves to a higher channel by pressing this button.
- AFT button:** This button is used to switch over the ON/OFF setting of the AFT (Auto Fine Tuning) function when presetting the channels.

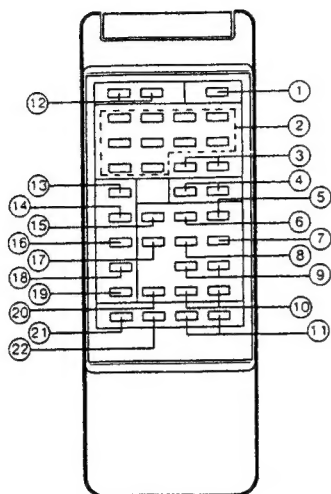
REAR PANEL



- ① **VIDEO IN socket**
For connection to a video output line.
- ② **VIDEO OUT socket**
For connection to a monitor TV or a video input socket.
- ③ **AUDIO OUT socket**
For connection to a monitor TV or an audio input socket.
- ④ **AUDIO IN socket**
For connection to an audio output line.
- ⑤ **TV SELECT switch**
(NTSC 4.43/PAL 60 (NTSC ON PAL))
Used when playing back NTSC recorded tapes.
- ⑥ **TUNER switch (AUTO, B/G, I)**
Switch this switch when you receive a broadcast programme interfered with noise in an area where a NICAM programme (England area) is aired.
Use the "AUTO" position when a normal TV programme is received or recorded.
Use the "B/G" or "I" position to the broadcast system when NICAM programme is broadcast from the TV station.
- ⑦ **AERIAL IN socket**
Connect the aerial lead to this terminal.
- ⑧ **AERIAL OUT plug**
Connect this terminal to the socket on the TV.
- ⑨ **TEST SIGNAL switch**
Provides a test signal to assist you to tune your television receiver to the output of the VTR.
- ⑩ **TV SYSTEM switch (G,I,K)**
Select the "G" or "I" or "K" position according to the TV set connected to the VTR.
SYSTEM G: Use this position when the VTR is connected to a PAL/SECAM G type TV set.
SYSTEM I: Use this position when the VTR is connected to a PAL I type TV set.
SYSTEM K: Use this position when the VTR is connected to a PAL/SECAM K type TV set.
When you receive an NTSC programme or when you playback an NTSC tape, the VTR outputs the video signal in the M system mode automatically even if the switch is set to any of these setting positions.
- ⑪ **UHF CHANNEL control**
Adjust the output from the VTR to your television receiver to any channel.
Europe: E30 to E39 channel
USA: US26 to US38 channel
JAPAN: J25 to J37 channel
China: C22 to C26 channel
- ⑫ **Power lead**
Connect to a wall AC outlet.
Note:
For the IN sockets of above items ① and ④, the VTR is automatically switched into the line input mode immediately after the external pins are inserted into these sockets.

REMOTE CONTROL UNIT

The buttons that are not followed by explanations have the same functions as the buttons similarly marked on the VTR.



① **ON/STANDBY button**

This button is used to turn the VTR on and off.

② **10 keys**

10 keys: Used to directly select the desired channel. When you select channels 1 to 9, combine the 0 key and any of the keys 1 to 9 make channels such as 01, 02, 03, etc.

Also used to specify the index number when performing index skip search.

③ **Channel select buttons (up/down)**

To initiate TV channel programming.

④ **Record buttons (REC)**

Press to start recording. The REC indicator comes on. When recording, be sure to press the two buttons simultaneously.

⑤ **Fast forward button (FF)**

⑥ **STOP button**

⑦ **X2 button**

Used to playback a tape at a speed double the normal play mode.

⑧ **PLAY button**

⑨ **SLOW buttons**

This button is used to slowly play back the picture. Use the 1/12 button to perform the 1/12 slow playback. Use the 1/6 button to perform the 1/6 slow playback.

⑩ **TRACKING/SLOW TRACKING button**

- In the play mode, press this button to adjust tracking.

- In the slow mode, if the noise appears on the screen, keep pressed these buttons until you obtain the best possible image on the screen.

⑪ **TIMER buttons**

Used to make the VTR enter the timer mode, especially for the one-touch timer recording. When doing the timer recording, be sure to press the two buttons simultaneously.

⑫ **PICTURE SHARPNESS (SOFT/SHARP)**

Use this button to make a playback picture softer or sharper.

When these two buttons are pressed simultaneously, tracking position is adjusted to the center.

⑬ **INDEX button**

Used to perform index search and index skip search.

⑭ **TIME SEARCH button**

Used to have the VTR enter the time search function mode.

⑮ **Rewing button (REW)**

⑯ **ZERO RETURN button**

Used to rewind or fast forward the tape around "0H00M00S" position that is set with the RESET button.

⑰ **PAUSE/STILL button**

⑱ **REMAIN/CLOCK button**

Use to switch the display between time, counter and tape remaining display cyclically.

⑲ **COUNTER RESET button**

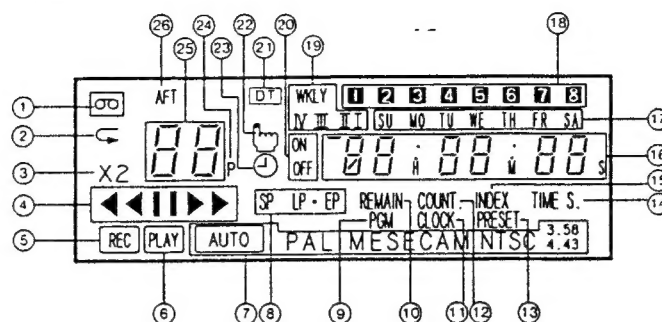
Used to reset the counter reading.

⑳ **DT (DIGITAL TRACKING) button**

㉑ **SP/LP·EP select button**

㉒ **OTR button**

INDICATORS



① Cassette indicator

The lamp is lit when a cassette is loaded, even when the power is off. The lamp flashes when a tape is being inserted or ejected.

② Repeat play back indicator

Lights when the VTR enters the repeat playback mode after the PLAY button is kept pressed for six seconds in the play mode.

③ X2 indicator

Lights when the X2 button is pressed.

④ Multifunctional indicators

See the indicator's table below.

Indicator's table

Play	Still	Record	Double Speed Play
▶ PLAY	⏸ PLAY	▶ REC	▶ PLAY
◀◀ REW	▶▶ FF	▶▶ Frame PLAY	▶ Slow PLAY
◀◀ Reverse Picture Search PLAY	▶▶ Forward Picture Search PLAY	⏸ Recording Pause REC	

⑤ REC indicator

Lit when the unit is in the REC mode or REC pause mode.

⑥ PLAY indicator

Lights when the VTR is in the play mode or when the VTR is in the mode that is accompanied with the "PLAY" display in the above indicator's table.

⑦ VIDEO SYSTEM indicator

Lights according to the broadcast system that the VTR receives and the video format of the tape being played back.

⑧ Tape Speed indicator (SP/LP-EP)

When playing back a pre-recorded tape, the tape speed mode is automatically indicated.

When recording, the tape speed, to which the VTR is set, is indicated in the display.

⑨ PGM indicator

Lights when the PGM button is pressed.

⑩ REMAIN indicator

Lights when the REMAIN/CLOCK button is pressed so that the remaining time is displayed.

⑪ CLOCK indicator

Lights when the CLOCK SET button is pressed.

⑫ COUNT. indicator

Lights when the REMAIN/CLOCK button is pressed so that the VTR enters the counter mode.

⑬ PRESET indicator

Lights when the PRESET button is pressed.

⑭ TIME S. indicator

Lights when the TIME SEARCH button is pressed.

⑮ INDEX indicator

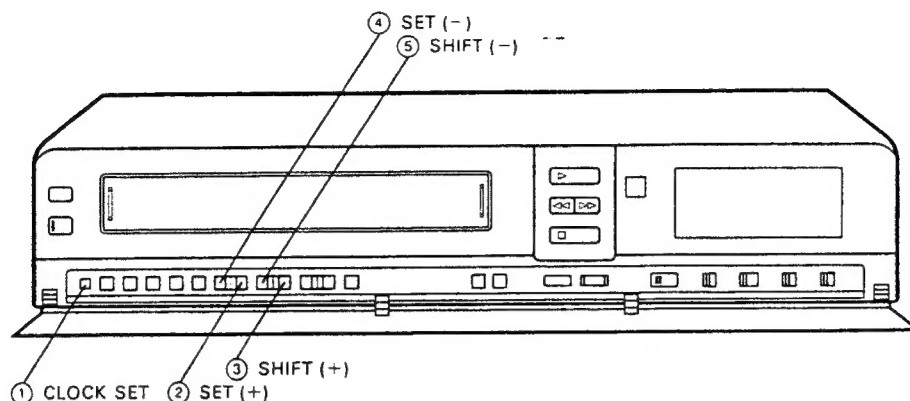
Lights when the INDEX button is pressed.

⑯ Multi window

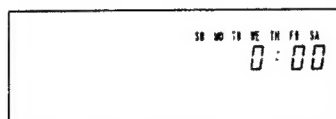
INDICATORS

- ⑰ **Day indicator**
Shows the current day for the VTR clock and the day when the timer programme will begin.
- ⑱ **Programme number indicator**
These lamps indicate the programme number into which a programme setting has been entered when setting the programmable timer.
- ⑲ **Week indicator**
Lights when setting the week.
(I → II → III → IV → WKLY).
- ⑳ **Programme timer start and end time indicators (ON/OFF)**
Light during timer start and end setting, and when the CFM button is pressed.
- ㉑ **DT indicator**
Lights when the VTR is in the digital tracking mode.
- ㉒ **OTR indicator**
Lights during one touch recording.
- ㉓ **Timer indicator**
Lights when the TIMER button is pressed.
- ㉔ **Channel position indicator**
Lights when selecting the channel positions in channel presetting procedure.
- ㉕ Shows the channel position number in channel presetting and channel number in timer programming and TV channel selection.
- ㉖ **AFT indicator**
Lights when the AFT button is pressed while the VTR is in the preset mode.

SETTING THE VTR CLOCK

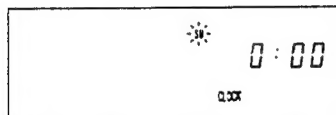


When the power lead is first connected to the AC outlet, or after an interruption of the power supply, the indication SU...SA 0:00 appears, flashing on the display as shown.



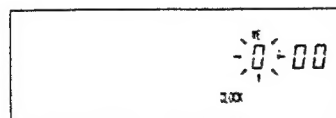
Example: To set for WE 19:25 (Wednesday, 19:25)

1. Press the CLOCK SET button ①



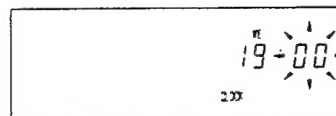
Press the SET (+) button ② to indicate "WE" on the indication of the day of the week.

2. Press the SHIFT (+) button ③ to set the flashing position to the hour indication.



Press the SET (+) button ② to indicate "19" on the hour indication.

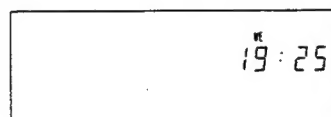
3. Press the SHIFT (+) button ③ to set the flashing position to the minutes indication.



Press the SET (+) ② to indicate "25" on the minutes indication.

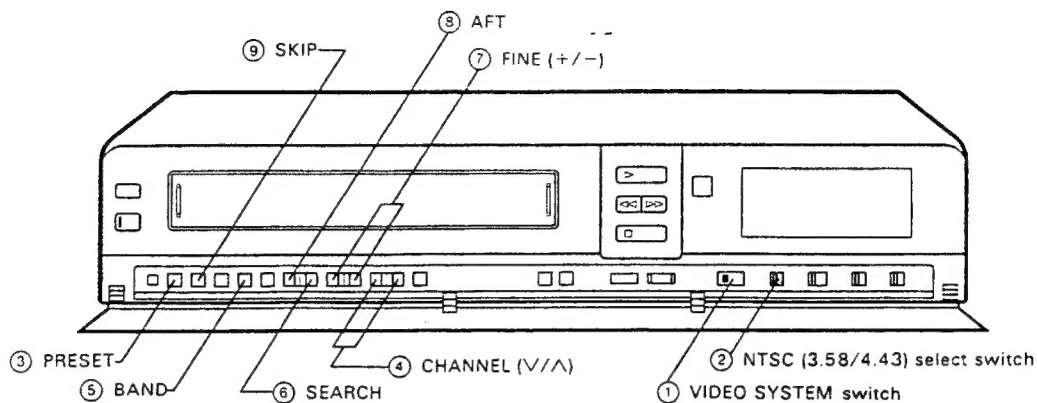
Notes

1. When the SET (+)/(-) button ②, ④ is pressed once, the digit advances by one. When the button is held down, the digits advance rapidly.
2. If you pass the desired time inadvertently, use the SET (-) button ④ to turn back the hour, minutes and day of the week.
3. If you want to change the indication selected after the next setting step is performed, use the SHIFT (-) button ⑤ to return the indication to the previous setting indication.
4. Press the CLOCK SET button ① to display the current time. When the button is pressed, the clock starts from zero seconds.



To synchronize the clock with the radio time signal, press the CLOCK SET button ① on the last pip of the hourly time signal.

CHANNEL SELECTION

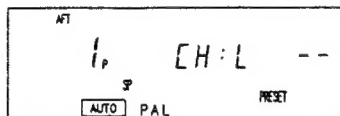


The tuner built-in this VTR is a VS (Voltage Synthesized) tuner. And it has also an AFT (Auto Fine Tuning) function.

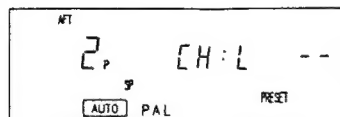
PRESETTING THE CHANNELS

For example: To preset a UHF channel station to position 2.

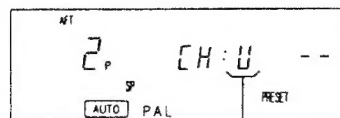
1. Turn on the VTR.
2. Select the VIDEO SYSTEM switch ①
This switch is set according to the broadcast system in which you receive TV programmes. Normally set it to the "AUTO" position. If the receiving condition is bad and the auto-judging feature cannot be used, set this switch to the manual positions (PAL, MESECAM/SECAM/NTSC).
- When receiving NTSC M signals, set the NTSC (3.58/4.43) select switch ② to the 3.58 position.
3. Press the PRESET button ③.



4. Set the channel position to be preset using channel select buttons (up/down) ④ or the number keys on the remote control unit "2"

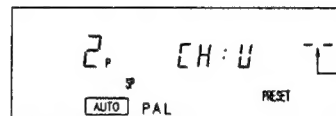


5. Press the BAND button ⑤ to select VL, VH, UHF station. (Select UHF for this example.)



"L" for V_L station
"H" for V_H station
"U" for UHF station

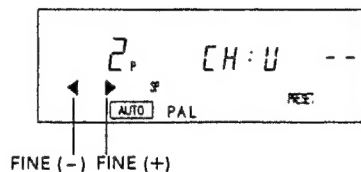
6. Press the SEARCH button ⑥. Scanning starts from the lower channel. During scanning, the AFT indicator goes off.



During scanning, these indicators move from the lower position to the upper position.

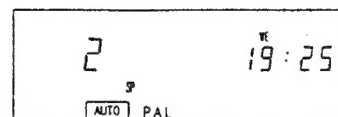
When the received channel is scanned, the AFT indicator lights up and scanning stops. Press the SEARCH button ⑥ repeatedly until the desired channel is scanned.

7. If a good picture does not appear after searching, make fine adjustment using the FINE (+/-) buttons ⑦.



Adjust the channel so that you can obtain the best position picture. When the AFT button ⑧ is pressed, the channel returns to a position where the channel has stopped during auto searching operation.

8. Repeat steps 4 to 7 (up to 48 positions).
9. Press the PRESET button ③.



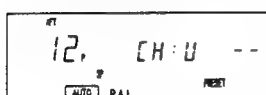
CHANNEL SELECTION

Channel skip operation

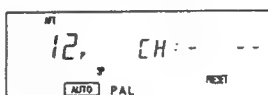
This function enables you to skip the channel positions you do not want to select when selecting the channel positions with the channel select buttons (up/down).

1. Press the PRESET button ③.
2. Select the channel position you want to skip with the channel select buttons (up/down) ④.
3. Press the SKIP button ⑤. The indications shown below will appear with the SKIP button on or off.

Channel skip off



Channel skip on

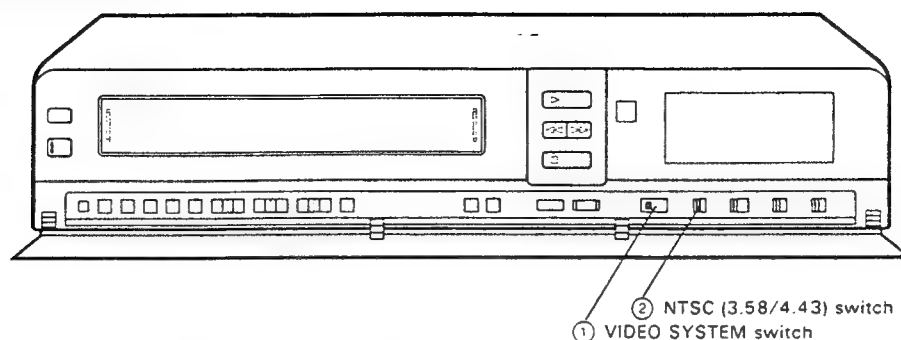


4. Press the PRESET button ③.

Notes

1. Skip operation cannot be performed in the channel setting mode.
2. Direct channel selection is also possible even in the channel skip operation mode.
3. To release the channel skip function, perform steps 1 through 4 as for the channel skip setting operation.

RECORDING



BEFORE STARTING TO RECORD

The VIDEO SYSTEM switch ① and the NTSC (3.58/4.43) switch ② are switches that select received broadcast systems and tape recording formats.

Check these switches before starting recording operation.

AUTO...Use this position for normal operation.

PAL/MESECAM, SECAM, NTSC3.58, NTSC4.43

....Use a corresponding broadcast system when you record a TV programme in a weak signal area where the broadcast signal cannot be judged with the switch set to AUTO.

- When you receive and record an NTSC M programme, set the NTSC (3.58/4.43) switch ② to the 3.58 position.

POSITION OF THE VIDEO SYSTEM SWITCH AND INDICATOR FOR RECORDING BROADCAST SIGNAL or LINE IN VIDEO SIGNAL

Broadcast system	LINE in. video signal	VIDEO SYSTEM SELECTION			Tape recording video format	Indicator
		Mode	VIDEO SYSTEM switch position	NTSC (3.58/4.43)		
PAL I PAL B/G PAL D	PAL	AUTO	AUTO	——	PAL	PAL
		MANUAL	PAL/MESECAM	——	PAL	PAL
SECAM B/G SECAM D/K.K1	SECAM	AUTO	AUTO	——	MESECAM	MESECAM
		MANUAL	PAL/MESECAM	——	MESECAM	MESECAM
			SECAM	——	SECAM	SECAM
NTSC M	NTSC 3.58	AUTO	AUTO	3.58	NTSC	NTSC 3.58
		MANUAL	NTSC	3.58	NTSC	NTSC 3.58
——	NTSC 4.43	AUTO	AUTO	4.43	NTSC	NTSC 4.43
		MANUAL	NTSC	4.43	NTSC	NTSC 4.43

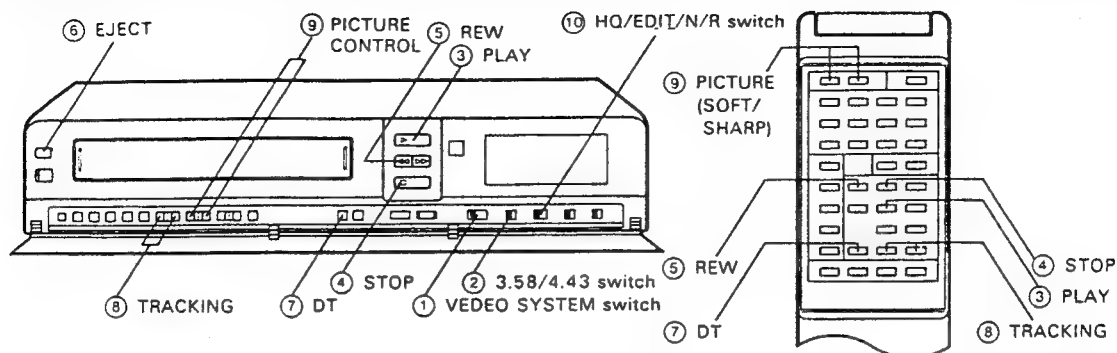
- This VTR cannot receive a SECAM L programme (broadcast in France).

A SECAM signal coming through the line input jacks (phono jacks), however, can be recorded with this VTR.

Note

If the VIDEO SYSTEM switch is set to the "AUTO" position when recording a SECAM B/G or D/K.K1 programme, or when recording SECAM signals through the line input terminal, the tape is recorded in MESECAM. If you want to record in the proper SECAM, set this switch to the SECAM position.

PLAYBACK



1. Insert a recorded cassette with a safety tab.
The power will be turned on.

Notes

When a cassette without safety tab is inserted, the VTR automatically starts playback and rewinds the tape at the end of the tape and ejected. After ejection, the VTR will turn off automatically.

2. Set the VIDEO SYSTEM switch ① according to the video format of tape to be played. Normally set to the "AUTO" position. When the condition of the tape is bad and the type of the tape cannot be judged automatically, use the manual operation and set the switch to a corresponding video system position. For NTSC tape playback, there are two types: 3.58 and 4.43. set the 3.58/4.43 switch ② to the correct position according to a TV set used.
3. Press the PLAY button ③.
Playback will begin.
The indicator "DT" (DIGITAL TRACKING) blinks in the display panel, and the optimum tracking point is automatically set.
4. When playback is finished, press the STOP button ④.
5. Press the REW button ⑤ to rewind the tape.
6. Press the EJECT button ⑥ to take out the cassette.

TRACKING CONTROL ADJUSTMENT

DIGITAL TRACKING adjustment

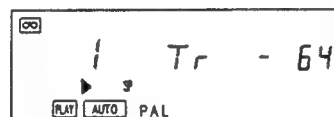
When the DT switch ⑦ is pressed in the play mode, the "DT" indicator lights in the display panel and the optimum tracking point is automatically set.

While the DT indicator is blinking, playback picture and sound may be distorted due to that tracking is being adjusted.

If you cannot obtain the best possible tracking point using the digital tracking function, adjust tracking by manual tracking operation.

MANUAL TRACKING ADJUSTMENT

Pressing the TRACKING button ⑧ in the play mode will release the VTR from the digital tracking status. The VTR will then enter the manual tracking mode.



Tracking can be adjusted within the range of $-64 < 0 > 64$.

Adjust the tracking point so that the best possible picture and sound can be obtained. When the two TRACKING buttons are pressed simultaneously, the tracking point is set to the center "0".

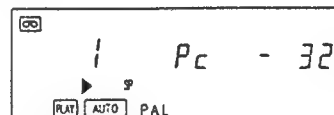
When the DT switch ⑦ is pressed, the VTR is set to the DIGITAL TRACKING mode again.

Note

When you play back a tape which has been recorded with another VTR, the noise on the screen may not be completely removed depending on the tape used.

PICTURE SHARPNESS ADJUSTMENT

When the PICTURE CONTROL button ⑨ is pressed in the play back mode, the picture can be made softer and sharper.



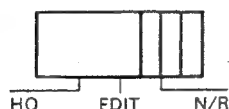
Picture sharpness can be adjusted within the range of $-32 < 0 > 32$.

When the two PICTURE CONTROL buttons are pressed simultaneously, the picture sharpness point is set to the center "0".

PLAYBACK

N/R (NOISE REDUCER) SWITCH

When playing back a rental video or an overilly copied tape which has a lot of noise in the video picture, you may reduce this noise by placing the HQ/EDIT/N/R switch ⑩ to the "N/R" position. In normal use, set this switch to the "HQ" position.

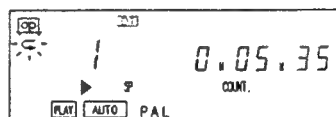


REPEAT PLAYBACK

When this function is used during playback, the VTR automatically rewinds the tape a its end and starts play back from the beginning of the tape. (Maximum of ten repeat play operations)

After repeat playback is completed, the VTR enters the stop mode.

1. Press the PLAY button ③ (for about 6 seconds).
The VTR enters the repeat playback mode.



2. After playing back to the end, the VTR automatically rewinds the tape and starts playback from beginning.
3. To resume normal playback, press the PLAY button ③ for about 5 seconds.

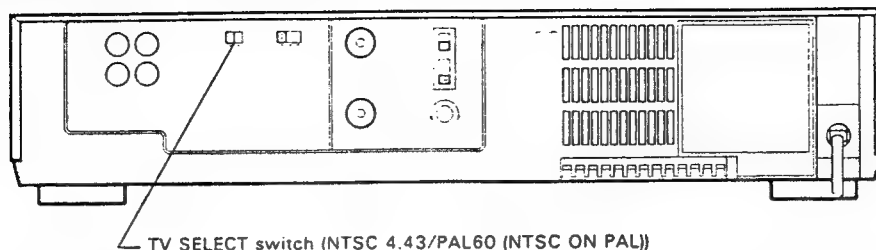
SETTING POSITIONS OF THE VIDEO SYSTEM SWITCH AND OUTPUT VIDEO SYSTEMS, DEPENDING ON TAPES PRE-RECORDED IN DIFFERENT TYPES OF VIDEO FORMAT

Select the appropriate position with the VIDEO SYSTEM switch so that tapes pre-recorded in different types of video format can be played back. The following table shows output video systems.

Video format of pre-recorded tape	VIDEO SYSTEM switch		Output color	
	MODE	POSITION	Line output (Phono type)	RF output (rear panel)
PAL	AUTO	AUTO	PAL	PAL G, I, K
	MANUAL	PAL/MESECAM		
MESECAM	AUTO	AUTO	SECAM	SECAM G, K
	MANUAL	PAL/MESECAM		
SECAM	AUTO	AUTO	SECAM	SECAM G, K
	MANUAL	SECAM		
NTSC	AUTO	AUTO · NTSC 3.58	NTSC 3.58	NTSC M
		AUTO · NTSC 4.43	NTSC 4.43	NTSC G
	MANUAL	NTSC · NTSC 3.58	NTSC 3.58	NTSC M
		NTSC · NTSC 4.43	NTSC 4.43	NTSC G

- PAL recorded tape....Commercially available tapes pre-recorded in PAL system, and tapes on which PAL-B/G, PAL-I and PAL-D programmes have been recorded.
- MESECAM recorded tape....Tapes on which SECAM-B/G and SECAM-D/K.K 1 programmes have been recorded with a MESECAM system VTR.
- NTSC recorded tape....Commercially available tapes pre-recorded in NTSC system, and tapes on which NTSC-M programmes have been recorded.

NOTES ON PLAYBACK



TV SELECT switch

This switch is provided to play back NTSC recorded cassette tapes with an NTSC 4.43 TV set or a PAL system TV set. Set this switch to the "NTSC 4.43" or "PAL 60 (NTSC ON PAL)" position. This VTR can play back NTSC recorded cassette tapes with a PAL video system TV set.

- PAL 60 (NTSC ON PAL)....Used to view an NTSC recorded tape with a PAL system TV set.
In this case, the position of the VIDEO SYSTEM switch on the front panel should be placed at NTSC 4.43.
- NTSC 4.43....Used to view an NTSC recorded tape with an NTSC 4.43 system TV set. When you do not view an NTSC recorded tape with a PAL system TV set, the switch should be placed at this position.

Playback of an NTSC tape recorded in the LP mode

With this VTR an NTSC tape recorded in the LP mode can be played back. But there are some points to be observed.

1. The quality of the playback picture is not guaranteed.
2. Special playback cannot be performed properly.
3. Tracking adjustment is always required when the tape is played back in the manual tracking mode.
4. The indicator "LP" appears in the display panel.

Notes when using a PAL TV set for NTSC playback:

1. Use a TV set compatible with PAL video signals of PAL 60 (525 lines).

When the TV set, that is not compatible with PAL video signals of PAL 60, is used (when the TV set, that is compatible only with PAL video signals of PAL 50 (625 lines), is used) NTSC playback pictures may roll up and down. This is not malfunction of the VTR or the TV set. If your TV set is equipped with a V-HOLD control, it may be possible to stop the rolling of pictures by adjusting this control.

About PAL 50 and PAL 60 of PAL video signals:

- PAL 50: is a normal signal and its PAL video signal is 50 fields (625 lines).
- PAL 60: is a special signal and its PAL video signal is 60 fields (525 lines).

Some TV sets operate properly only with PAL 50 signals, some TV sets operate properly with both PAL 50 and PAL 60 signals.

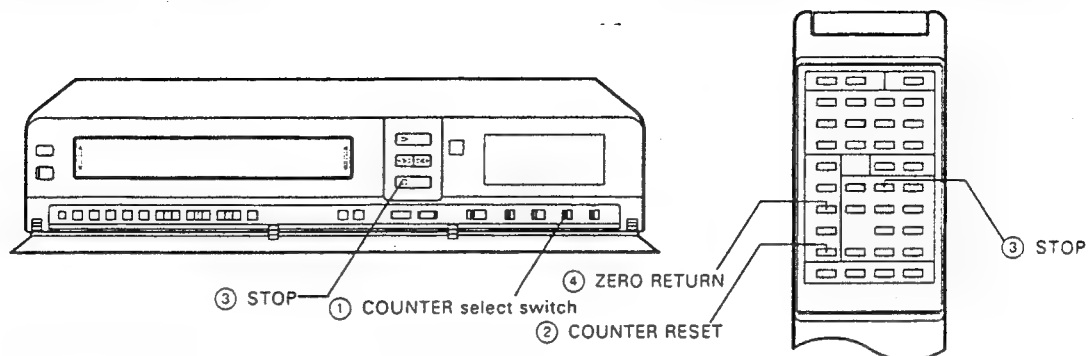
Therefore, if your TV set is switchable between PAL 50 (625 lines)/PAL 60 (525 lines), you can view an NTSC recorded tape in the PAL colour system with your own TV set.

2. Depending on the TV set used, the picture may shrink vertically and black bars may appear both at the top and bottom of the screen.
This is not an indication of malfunction.
3. The special playback operations (double speed playback, still playback etc.) may produce a skewed image and a lot of noise on the picture.
4. If the tape prerecorded in the SP mode is played back in the picture search mode, the picture is reproduced with no colour.

Note

For viewing an NTSC recorded tape, we recommend you to use an NTSC 3.58 or NTSC 4.43 TV set.

LINEAR TIME COUNTER AND ZERO RETURN

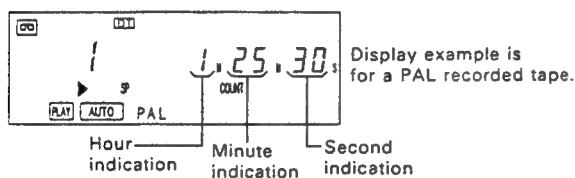


LINEAR TIME COUNTER

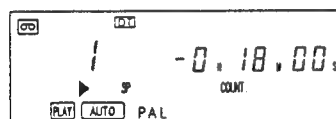
This VTR utilizes the linear time counter system. The linear time counter indicates tape run length on the display by the second.

The linear time counter installed in this VTR should be set, according to the types of video format of tapes to be recorded from or to be played back, with the COUNTER select switch (PAL, SECAM, MESECAM/NTSC) ①.

When the tape runs one hour twenty-five minutes thirty seconds:



When the tape is rewound after 0H00M00S:



Notes

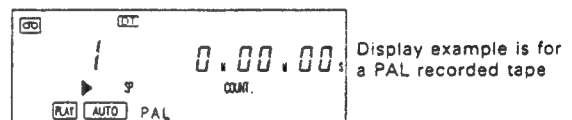
1. When the cassette is removed by pressing the EJECT button, the linear counter will return to 0H00M00S.
2. The counter does not work at the unrecorded section.

ZERO RETURN

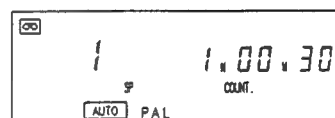
This function is very useful to easily find the desired scenes to be replayed later.

You can set the VTR so that the tape stops around 0H00M00S of the counter reading during rewinding and fast forward mode.

1. Press the COUNTER RESET button ② on the remote control unit at the point where the desired scenes to be replayed later begins while in the record and play modes.

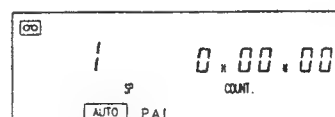


2. Press the STOP button ③ to stop the tape after the playing or recording is completed.

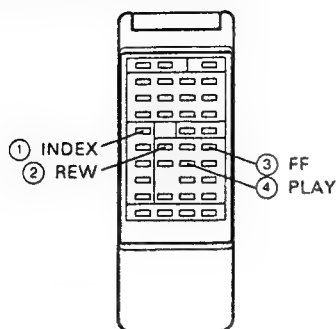


3. Press the ZERO RETURN button ④.

The tape will be rewound around "0H00M00S" of the counter reading. When the ZERO RETURN button is pressed after the tape is rewound before counter reading of "0H00M00S", the tape will be fast forwarded around "0H00M00S" before stopping.



INDEX SEARCH OPERATION



The VTR has VHS index search system function. This system performs the index search or skip search, using the index signal marked on the tape.

Index Search

Each time the VTR detects an index signal in the fast-forward or rewind mode, it plays back the beginning of each programme for 5 seconds.

Skip Search

When the VTR detects the selected index signal in the fast-forward or rewind mode, it automatically enters the playback mode.

MARKING THE INDEX SIGNALS

Automatic marking

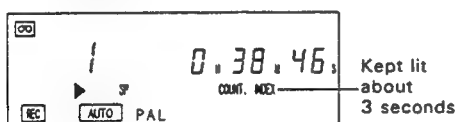
When recording starts from the stop mode, an index signal is automatically marked on the tape. An index signal is also automatically marked when timer recording and one touch recording starts.

Note

When the VTR enters the pause mode during recording and recording restarts, no index signal is marked.

Manual marking

Press the INDEX button ① on the remote control unit at the point you want to mark an index signal on the tape during recording, timer recording or one touch recording.

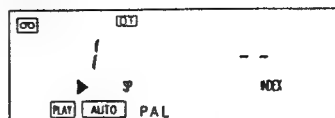


Notes

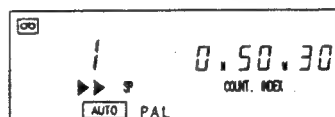
1. The index signal may not be able to be recorded on sections switched between SP and LP-EP.
2. The programme that has been registered at the very beginning of the tape, may not be correctly searched with the index search operation.
3. Press the INDEX button at an interval of more than one minute, during recording. (3 minutes are required in the LP-EP mode.)

INDEX SEARCH

1. Press the INDEX button ① on the remote control unit in the stop or playback mode.



2. Press the REW button ② or FF button ③ within 10 seconds. The tape will stop at the section recorded with index signal and then played back for five seconds.



(The above display is shown in the FF mode.)

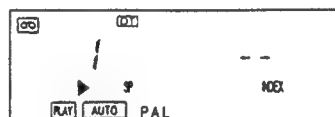
3. Press the PLAY button ④, when your desired programme comes on.

Note

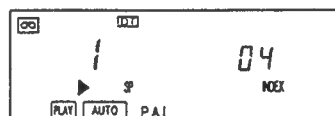
If you record index signals on the tape pre-recorded on another VTR, that recording may become blurred, and index search may not be performed correctly.

SKIP SEARCH

1. Press the INDEX button ① on the remote control unit in the stop or playback mode.



2. Specify the index number with the number keys on the remote control unit within 10 seconds.



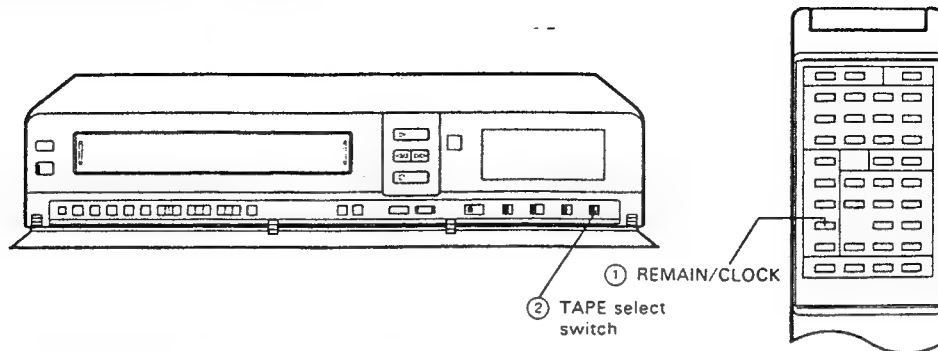
(The above display is shown when the index number is specified to 4.)

3. Press the REW button ② or FF button ③ within 10 seconds. The tape will stop at the section specified with the index number and be played back automatically.

Notes

1. The index number specification can be up to 99.
2. The number of the index display will decrease by one each time the index signal is skipped.
3. In some cases it may not be possible to skip search a programme that has been registered at the very beginning of the tape.

TAPE REMAINING DISPLAY



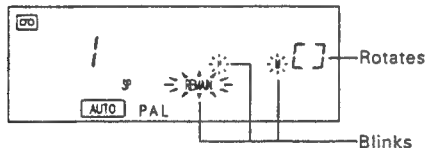
TAPE REMAINING DISPLAY IN THE STOP MODE

When the REMAIN/CLOCK button ① is pressed with the counter display shown in the display panel, the VTR enters the tape remaining display mode. While the display shows the clock time display, pressing the REMAIN/CLOCK button will let the VTR enter the counter display mode.

When the button is pressed again, the display shows the tape remaining display.

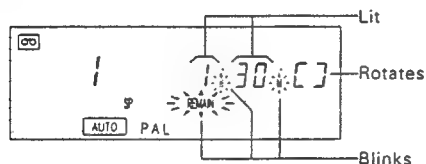
While counting the remaining time:

The display changes to the count mode. (Note: The tape remaining time is displayed for about 5 seconds.)

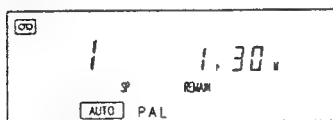


The counting is completed:

The tape remaining time will be displayed. The tape will be rewound to the original position.



When the tape is rewound to the original position. The display returns to the current time display.



Note

Pressing the button again after the calculation is done will display the contents read. This is not a malfunction.

TAPE REMAIN DISPLAY IN THE RECORDING OR PLAY MODE

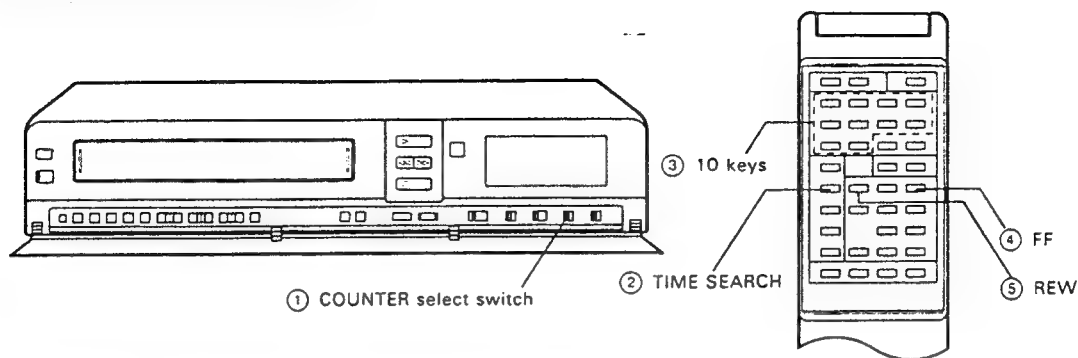
The remaining time on the tape can even be displayed during recording or playback.

1. The tape remaining time is automatically calculated during recording or playback, and is displayed by pressing the REMAIN/CLOCK button ①.
2. If the REMAIN/CLOCK button ① is pressed immediately after beginning recording or playback, the tape remaining time will be displayed after about half a minute.

Notes

1. Set the TAPE select switch ② to the correct position depending on the tape to be used.
PAL/MESECAM/SECAM mode
Use the E-180 position when using a shorter tape than an E-180 video cassette.
Use the E-240 position when using an E-240 video cassette.
NTSC mode
Use the T-120 position when using a shorter tape than a T-120 video cassette.
Use the T-160 position when using a T-160 video cassette.
2. While in the fast forward or rewinding mode, even if the REMAIN/CLOCK button ① is pressed, the counter display will not change to the tape remaining display.
3. The tape remaining display shows the approximate time remaining on the tape.

TIME SEARCHING



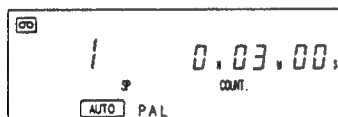
This feature forwards or rewinds the tape by the amount of the specified time from the current tape time indication, in the play or stop mode.

Set the COUNTER select switch (PAL, SECAM, MESECAM/NTSC) ① according to the video format of the tape to be played back.

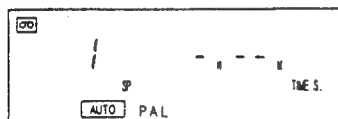
Example:

Tape...PAL recorded tape
VTR operation mode...Stop mode
setting time...to advance by one hour fifteen minutes

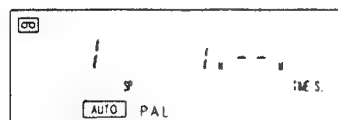
Initial display



1. Press the TIME SEARCH button ② on the remote control unit.
Perform step 2 within ten seconds.

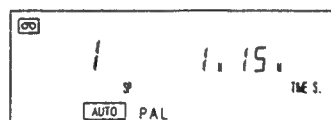


2. Press the "1" key of the 10 keys ③ to set the hour time.
Perform step 3 within ten seconds.

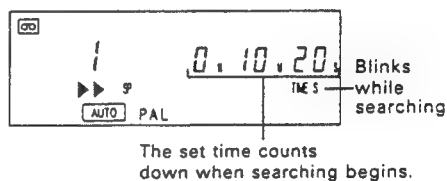


When setting the time searching time of within one hour, input zero hour with the "0" key.

3. Press the "1" key then "5" key of the 10 key ③ to set the minutes time.
Perform step 4 within ten seconds.

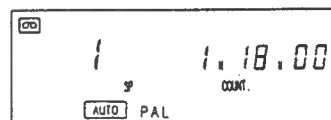


4. Press the FF button ④ or the REW button ⑤ to forward or rewind the tape. For this example, press the FF button ④. Time searching starts.



The set time counts down when searching begins.

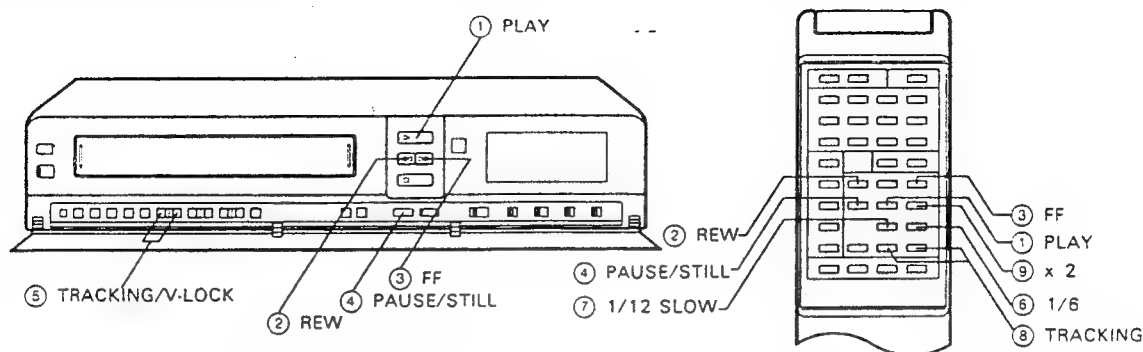
5. Upon completing searching the set time the VTR enters the stop mode, showing the reading of about 0H00M00S in the display.



Notes

1. In the play mode, time searching is performed in the forward picture search and reverse picture search mode.
After time searching has finished at the counter reading of about 0H00M00S, the VTR enters the normal play mode automatically.
2. The time display may show a not accurate but approximate time indication.

SPECIALIZED PLAYBACK



PICTURE SEARCH

1. Press the PLAY button ①.
2. When the REW button ② or FF button ③ is pressed, the picture moves quickly (about 7 times the normal speed in PAL/SECAM/MESECAM mode and 5 times the normal speed in NTSC mode) in reverse or forward direction, and you can search for the desired parts of a programme.

Notes

1. When playing back recorded tape in the picture search mode, the skewed picture may appear and/or colour may disappear.
2. During picture search operation, if the picture rolls vertically on the TV screen, adjust the V-HOLD knob on the TV set.
3. During the picture search operation, the sound will be muted.

STILL PICTURE

1. Press the PLAY button ①.
2. To stop the tape momentarily or to watch a still picture during playback press the PAUSE/STILL button ④.
3. Press the PAUSE/STILL button ④ again to release the still picture and return to normal playback.
If noise appears in the still picture, perform manual tracking adjustment in the slow play mode to set the tracking to the best point. Then, play a still picture.

STABILITY OF STILL PICTURE

When the PAUSE/STILL button ④ is pressed and the picture is slightly distorted and flickered, press the TRACKING/V-LOCK button ⑤ to adjust the stability of the picture. Doing this may reduce this problem.

Notes

1. The still mode will cease automatically after a lapse of approximately 5 minutes. The VTR will return to PLAY from STILL.
2. Even the tape pre-recorded with another VTR is played back in the still mode and adjusted with the TRACKING/V-LOCK buttons, the distortion of the picture might still remain.
3. The NTSC tape playback in the still mode may cause the reproduced picture to flicker on the TV screen.

FRAME ADVANCE

1. Press the PLAY button ① (in play mode).
2. Press the PAUSE/STILL button ④ (in still mode).
3. Press the PLAY button ①. One press on the PLAY button ① will advance one frame on the tape.
4. Release the PLAY button ① and then press the PAUSE/STILL button ④. The VTR returns to normal playback.

SLOW PLAY

Press the SLOW button allows you to play back the picture at 1/6 or 1/12 the speed of normal playback.

1. Press the PLAY button ①.
2. Press the 1/12 SLOW button ⑦ or 1/6 SLOW button ⑥.
3. Press the PLAY button ① again to resume normal playback.

STABILITY OF SLOW PICTURE

When noise appears in the slow mode, adjust the TRACKING/V-LOCK buttons ⑤ on the VTR or the TRACKING buttons ⑧ on the remote control unit for better picture playback.

Notes

1. The slow mode will cease automatically after a lapse of approximately 5 minutes. The VTR will return to PLAY from SLOW.
2. Even the tape pre-recorded with another VTR is played back in the slow mode and adjusted with the TRACKING/V-LOCK buttons, noise might still remain in the slowplay picture.

DOUBLE SPEED PLAYBACK

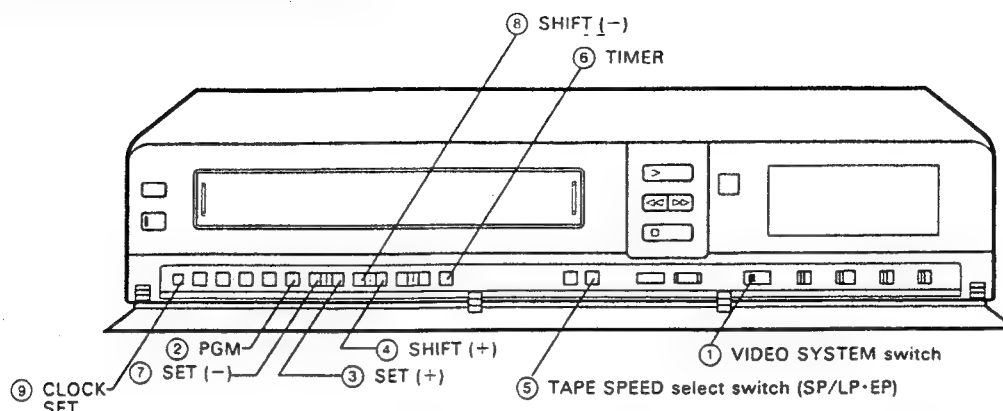
Pressing the X2 button allows you to play back the picture at a speed double the normal playback.

1. Press the X2 button ⑨ in the play, stop or slow mode.
2. Press the PLAY button ① again to return to the normal play mode.

Note

- When a cassette tape prerecorded in the LP mode of PAL, SECAM or MESECAM is played back in the still, slow, frame or double speed play mode, the picture may be reproduced without color, the color is of poor quality.
- DT (DIGITAL TRACKING) can function only in the play mode, this function does not activate in the specialized playback mode.

TIMER RECORDING



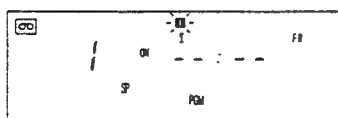
The timer in this VTR can hold eight preset programmes over a 4 week (28 days) period. These programmes may be for one time recordings, recording at the same time every day or recording on the same day of the week. The clock has a 24 hour format. This VTR is capable of 28-day timer setting, and is designed to start timer recording when the TIMER button is pressed.

OPERATING OUTLINE

- **SHIFT (+/-) button**
This button is used to move the programming item while making a programme. The blinking position moves.
- **SET (+/-) button**
This button is used to change the programming contents of the blinking position while making a programme.
- Be sure to check the clock setting is completed before doing timer recordings.
- Be sure to check the cassette for recording, has a safety tab.

Example: To preset channel 25 in programme 2 from 13:30 to 14:20 of the next week on Tuesday, in SP mode. (Today is Friday at 9:00)

1. Set the VIDEO SYSTEM switch ① according to the broadcast system of the programme to be recorded. (For more details, refer to section "RECORDING" on page 17.)
2. Press the PGM button ②, to enter the timer programme mode position.



3. Press the SET (+) button ③ to set "2" position.



4. Press the SHIFT (+) button ④. The channel indication will be flashing. Set the channel to "25" with the SET (+) button ③.



5. Press the SHIFT (+) button ④. The week indication will be flashing. Set the week to the "II" position with the SET (+) button ③.



Pressing the SET (+) ③ will change the week indication from I → II → III → IV → WKLY to DAILY cyclically.

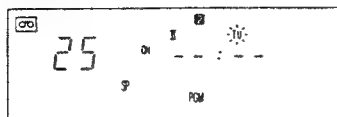
When the week indication is set to WKLY (WEEKLY), you can record the programme of the same time every week. When the week indication is set to DAILY (the indication of all the days such as SU, MO, TU, WE, TH, FR, and SA will light), you can record the programme of the same time every day.

Notes

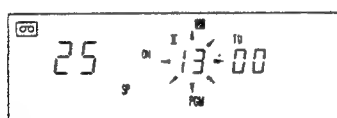
1. If you pass the desired time or setting position inadvertently, use the SET (-) button ⑦ to display the correct indication.
2. If you want to return to the previous setting step, use the SHIFT (-) button ⑧.

TIMER RECORDING

6. Press the SHIFT (+) button ④. The day indication will be flashing. Set the day to the "TU" position with the SET (+) button ③.



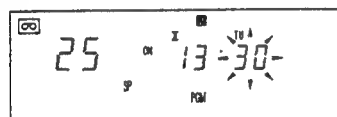
7. Press the SHIFT (+) button ④. The on time hour indication will be flashing. Set the on time hour to "13" with the SET (+) button ③.



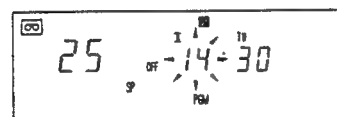
Note

When the SET (+) button ③ or SET (-) button ⑦ is pressed once, the current time will be displayed on the on time indication.

8. Press the SHIFT (+) button ④. The on time minutes indication will be flashing. Set the on time minutes to "30" with the SET (+) button ③.

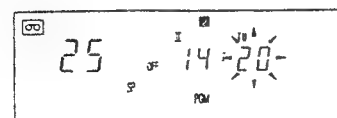


9. Press the SHIFT (+) button ④. The off time hour indication will be flashing. Set the off time hour to "14" with the SET (+) button ③.



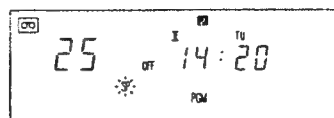
When the SET (+) button ③ or SET (-) button ⑦ is pressed once, the set time for on time will be displayed as off time.

10. Press the SHIFT (+) button ④. The off time minutes indication will be flashing. Set the off time minutes to "20" with the SET (+) button ③.

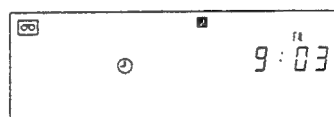


11. Press the SHIFT (+) button ④.

Then select the tape speed (SP or LP-EP) with the TAPE SPEED select button ⑤ or SET (+) button ③. Set it to the SP position.

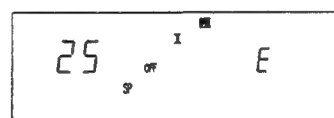


12. Press the TIMER button ⑥.

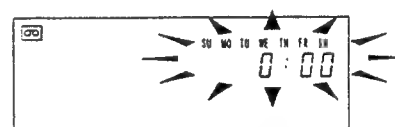


Notes

- When no cassette is loaded, timer recording is not possible. In this case, the "E" indicator is displayed while the TIMER button ⑥ is pressed.

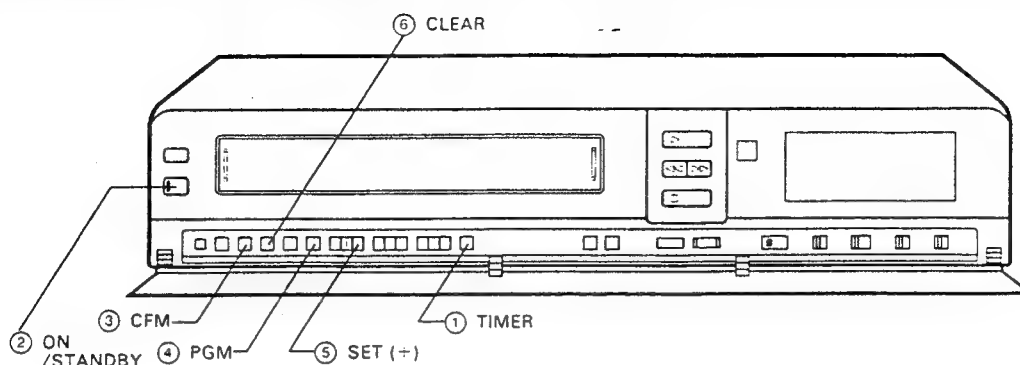


- If the cassette tab has been removed, timer recording is also not possible. At this time, the cassette is ejected automatically.
- When the clock is flashing after a power interruption as shown below, the preset programmes become ineffective. Reset the VTR clock to the current time with the CLOCK SET button ⑨ and do the programme setting from the beginning.



- To proceed to another programme setting after step 9 press the SHIFT (+/-) buttons ④ or ⑥ to select the programme number position and set the programme number with the SET (+) button ③.
- When you want to stop programme setting, press the PGM button ②. The clock display is shown.
- Timer setting is possible even in standby mode.

ADDITIONAL INFORMATION FOR TIMER RECORDING



TO USE THE VTR AFTER SETTING THE PROGRAMMABLE TIMER

1. Press the TIMER button ① to release the timer mode.
2. Press the ON/STANDBY button ② to turn on the VTR.
3. After use, be sure to press the CFM button ③ to verify the contents of the stored programmes.
4. To enter the timer mode again, press the TIMER button ①.

TO CHANGE TIMER PROGRAMME DATA

1. Press the TIMER button ① to release the VTR from the timer recording mode. The timer indicator (⌚) goes off.
2. Press the PGM button ④ to enter the timer programme operation mode.
3. Select the programme number to be changed with the SET (+) ⑤ and change programming data.
4. Press the PGM button ④ again. To enter the timer recording mode, press the TIMER button ①.

TO CANCEL THE TIMER PROGRAMME

1. Press the TIMER button ① to release the VTR from the timer recording mode. The timer indicator (⌚) goes off.
2. Press the PGM button ④ to enter the timer programme operation mode.
3. Specify the programme where the programme data to be cancelled are placed, with the SET (+) button ⑤.
4. Press the CLEAR button ⑥. The timer off time and channel are also erased.

TO CHECK THE TIMER PROGRAMME

The following method is available to check the data preset in the timer programme.

1. Press the CFM button ③.

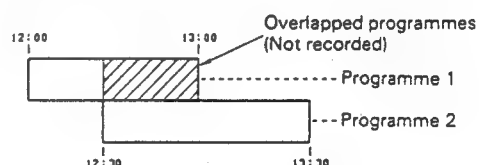
The fluorescent display will show the contents of programmes 1 through 8 (start time and end time) that were previously stored continuously at an interval of about five seconds and return to the original display.

When any effective programme data has not been memoried, the "E" indicator appears in the display.

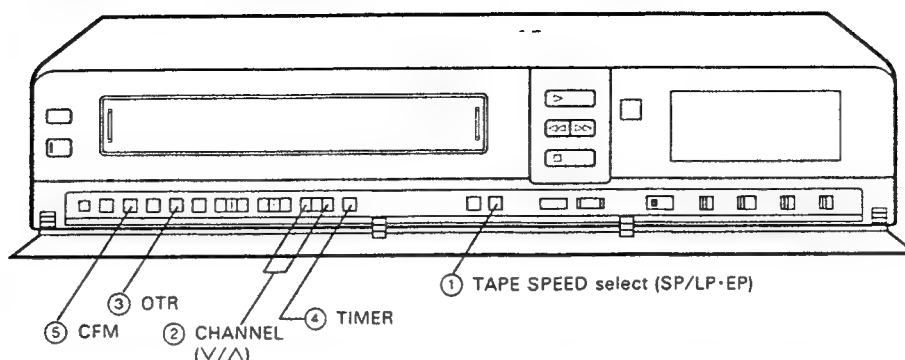
PROGRAMME OVERLAPPING

Be careful not to overlap the preset times.

If you happen to overlap the preset programmes, start time has priority in execution, and the overlapped programme will not be recorded. See figure below.



ONE TOUCH TIMER RECORDING



This VTR unit features a one touch recording (OTR) function. This function allows you to record at 30 minute periods, for up to 4 hours.

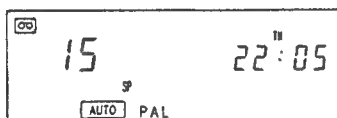
After the recording is completed, the power goes off automatically.

Also, when setting the timer, the off time can be set at 30 minute periods. The One Touch Recording (OTR) mode takes priority over other VTR operation modes. For example, when the OTR mode is activated while the VTR is in the timer mode, the VTR will automatically return to the timer mode after the OTR mode is completed.

OTR OPERATION

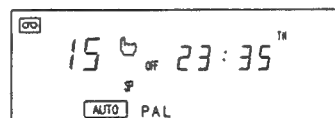
Example: To record channel 15 starting from now for 1-1/2 hours at a current time on Thursday, 22:05.

1. Set the recording speed (SP/LP-EP) with the tape speed select button ①.
2. Select channel 15 by pressing channel select buttons (up/down) ②.

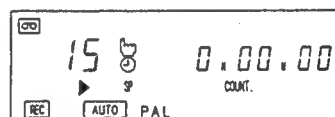


3. Press the OTR button ③ to set the recording time.
When the OTR button ③ is pressed once: 22:35 (30 minutes).

4. When the OTR button ③ is pressed twice: 23:05 (1 hour)
When the OTR button ③ is pressed three times: 23:35 (1 hour and 30 minutes)



5. Press the TIMER button ④ within 10 seconds.



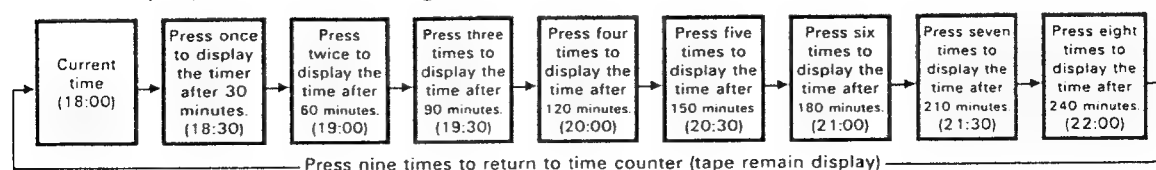
Notes

1. Thirty minutes are added every time the OTR button ③ is pressed, for up to 4 hours (eight times). (The one touch timer can only be set in 30-minute units.)
2. One-Touch Recording does not function while the VTR is in the timer programme confirmation mode, channel setting mode and clock setting mode.
3. When the CFM button ⑤ is pressed while the VTR is in the one-touch timer recording mode, the VTR shows the programme ending time (OFF).

Error indication

When the TIMER button ④ is pressed without setting timer on/off time, or without a cassette in the compartment, the "E" indicator lights (while the TIMER button ④ is pressed).

- Each time you press the OTR button ③, the indication will change as follows.



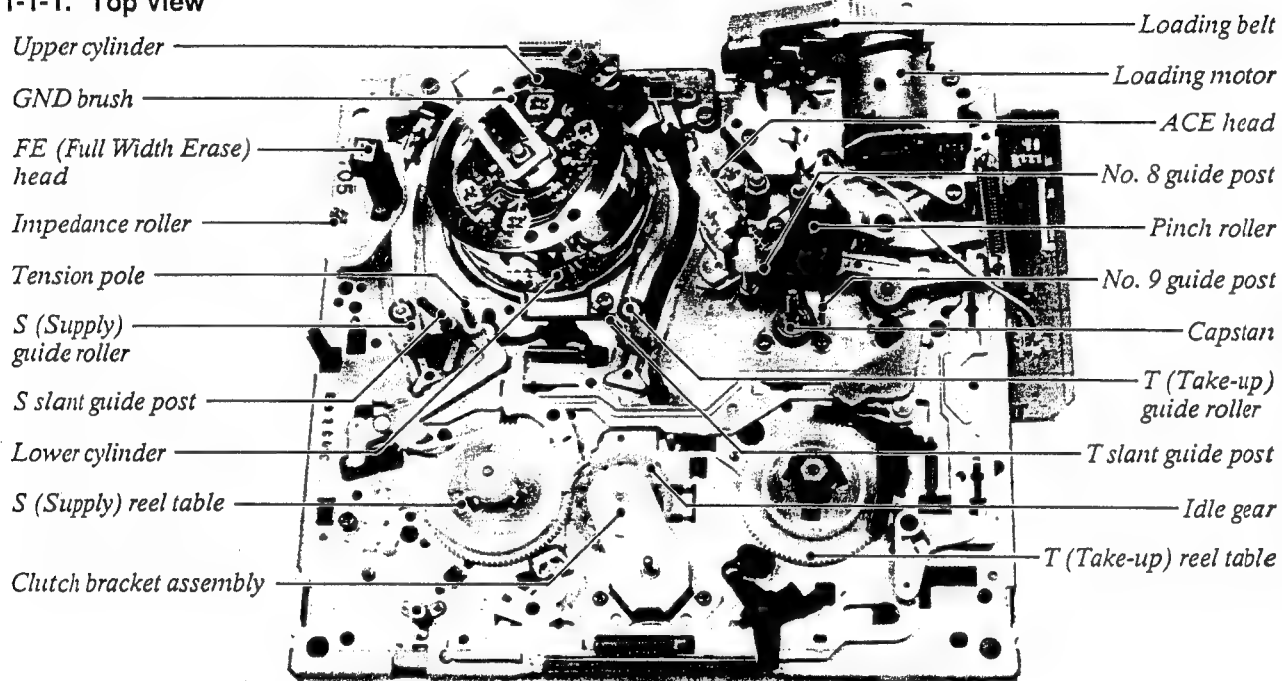
SECTION 2

ADJUSTMENT PROCEDURES

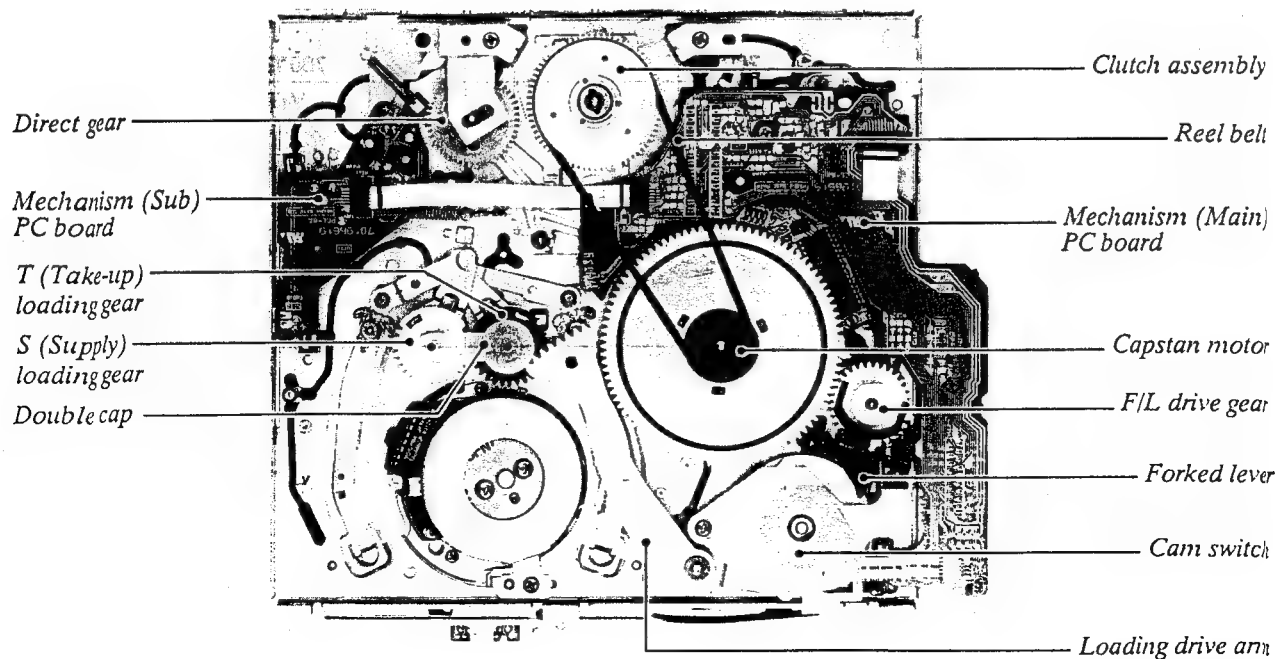
1. MECHANICAL ADJUSTMENT

1-1. Mechanical Parts Location

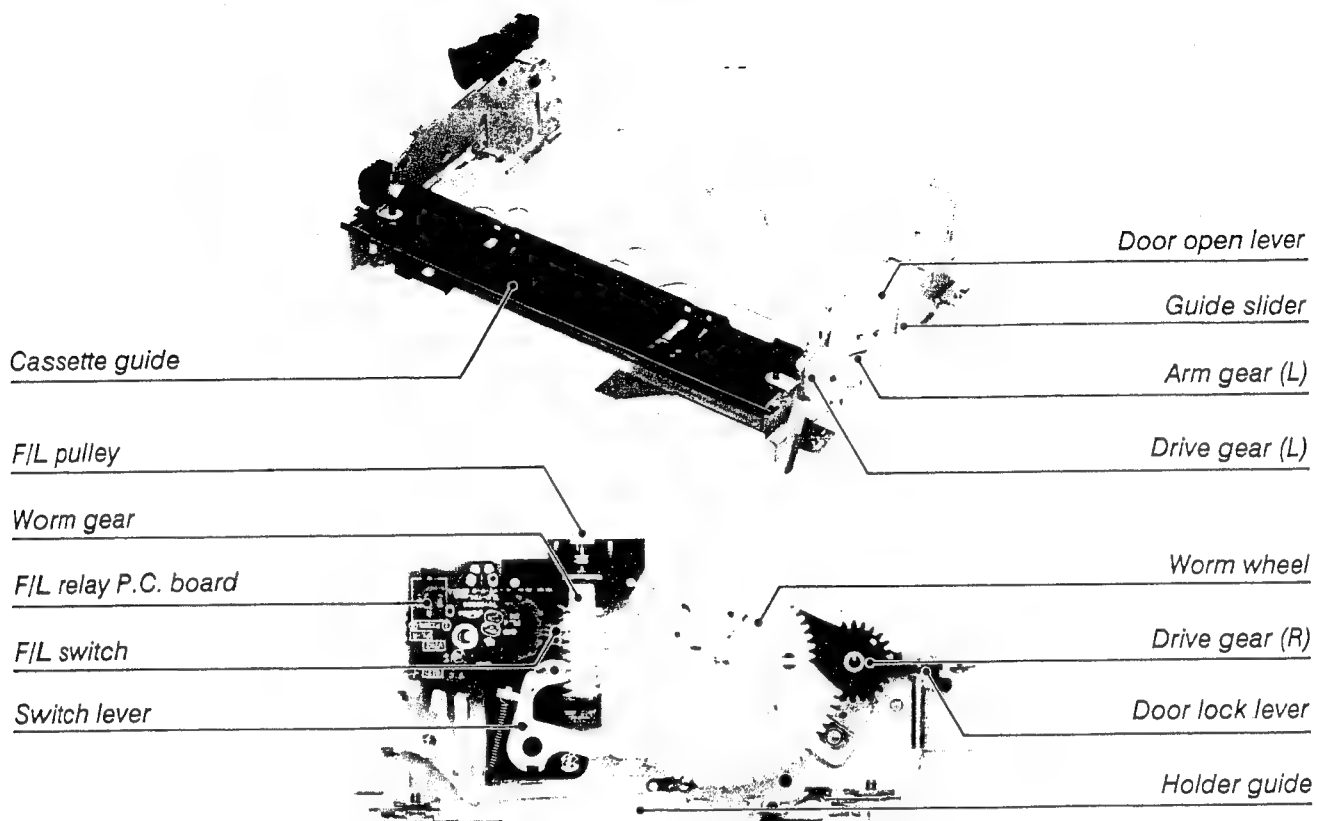
1-1-1. Top View



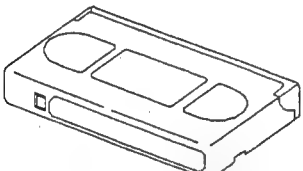
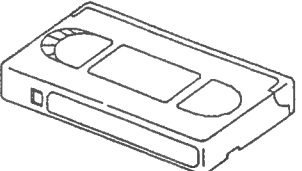
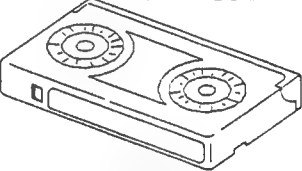
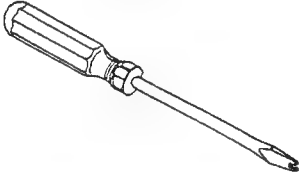
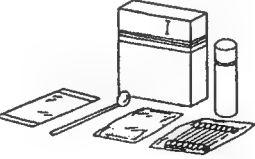
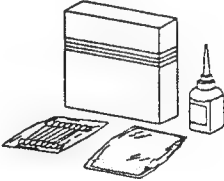
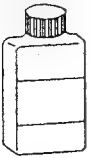
1-1-2. Bottom View



1-1-3. Front Loading Mechanism



1-2. Servicing Jig List

<p>Alignment tape</p>  <p>ST-C1 70909227</p>	<p>Back tension cassette gauge</p>  <p>70909103</p>	<p>Torque cassette gauge (KT-300NR)</p>  <p>70909199</p>
<p>Taper nut driver</p>  <p>70909228</p>	<p>VTR cleaning kit</p> 	<p>VTR oil kit</p> 
<p>Grease</p> 		

1-3. Main Parts Servicing Time

- Part replacement time differs from serving life time of each part.
- Following table is prepared based on a standard condition (room temperature, room humidity). The replacement time will be varied depending upon operation environment, using methods, operation duty, etc.
- Particularly, life of the upper cylinder depends upon operation conditions.

	Part Name	Servicing Time (Operating Hours)										Note
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape Transport System	Tension pole											<ul style="list-style-type: none"> • When cleaning, use a swab or a piece of gauze soaked in alcohol. • After the cleaning, cleaned parts are dried completely, and then load a video cassette. • When lubricating, always use the specified oil. • When lubricating, apply one or two drops of oil after the cleaning with alcohol.
	S-slant guide post											
	S-guide roller											
	Impedance roller											
	No. 8 guide post	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	Capstan											
	No. 9 guide post											
	Guide roller											
	T-slant guide post											
	Upper cylinder	Δ	○	Δ	○	Δ	○	Δ	○	Δ	○	
	FE head	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	○	
	ACE head	Δ	Δ	Δ	Δ	Δ	○	Δ	Δ	Δ	Δ	
	Pinch roller	Δ	Δ	Δ	Δ	Δ	○	Δ	Δ	Δ	Δ	
Tape Drive System	Capstan motor						○				○	
	Reel belt		Δ		○		Δ		○		Δ	
	Loading motor										○	
	Loading belt		Δ		○		Δ		○		Δ	
	Supply reel table				▲				▲		○	
	Take up reel table				▲				▲		○	
	Idle gear assembly		○		○		○		○		○	
Others	Band brake assembly		○		○		○		○		○	• Check the back tension.
	Head cleaner		○	○	○	○	○	○	○	○	○	

Δ : Cleaning ▲ : Lubrication ○ : Check and replace if necessary

1-4. Main Parts Replacement

1-4-1. Front Loading Assembly Replacement

(1) Front loading assembly replacement

< Replacement >

1. Remove the top cover, front panel, and the bottom plate.
2. Remove the FL belt from rear bottom of the unit.
3. Disconnect the connector (A) from the F/L-R P.C. board.
4. Remove two screws (A).
5. Move the front loading assembly in direction shown by the arrow and remove it from the mechanism deck.
6. When remounting, use the above steps in reverse order.

Note:

When reinstalling the FL belt, take care the belt is not twisted.

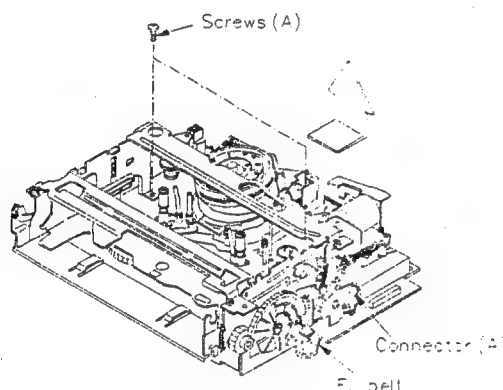


Fig. 4-1-1 Front loading assembly replacement

(2) F/L switch (SI22) and photo-transistor (Q121) replacement

1. Remove the screw (B) and the F/L-R P.C. board.
2. To remove the F/L switch and photo-transistor, unsolder the leads.
3. Replace them with new ones.

Note:

When reinstalling the F/L-R P.C. board, take care the F/L switch is not damaged.

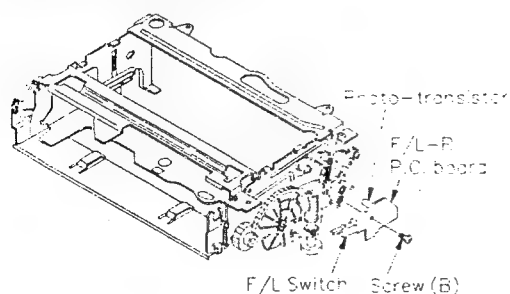


Fig. 4-1-2 F/L switch and photo transistor replacement

(3) Guide slider (K317) replacement

1. Turn the FL pulley gear with your hand until the cassette holder is set to the cassette in condition.
2. Move the holder guide L outward and remove the guide slider from the cassette holder. Then, remove the guide slider from the holder guide L.
3. When remounting, use above steps in reverse order.
4. Turn the FL pulley gear with your hand and set the cassette holder to the cassette out condition.

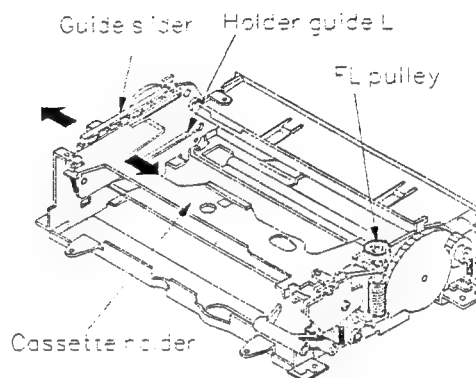


Fig. 4-1-3 Guide slider replacement

(4) Replacement of other parts

1. Do not replace the components not authorized. (Refer to the Parts List.)
If replaced, accuracy of the front loading assembly will decrease and smooth operation may be not obtained.
2. When replacing the arm gear and the drive gear, take care on the following points:
 - a: Position the arm gear and the drive gear so that their alignment marks match with the arm gear facing almost upward as shown in the illustration, and then mount them. This is true for both the left and right sides.
 - b: If the alignment marks are not matched, the front loading may not operate smoothly.

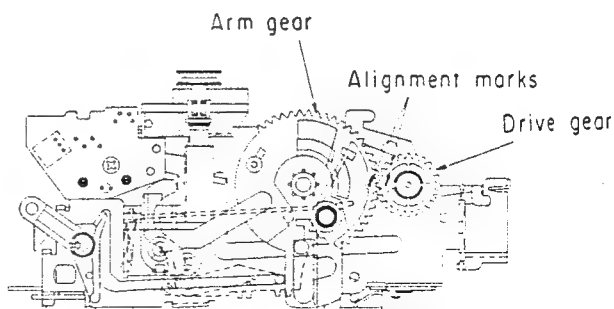


Fig. 4-1-4

1-4-2. Cylinder Replacement

(1) Upper cylinder assembly

< Check >

1. Are video heads damaged or worn out?
2. Are video heads clogged?
(Replace it if the clogging is not cured by cleaning.)

< Replacement >

1. Remove head cleaner assembly.
(Refer to item 1-4-2 (5).)
2. Remove screw securing ground brush and remove the ground brush.

Note:

Take care not to damage the cylinder when removing the ground brush.

3. Unsolder the relay terminals on the head relay P.C. board. The solder will be removed easily using a desoldering wire. (Fig. 4-2-1, 4-2-2)
4. Remove two screws and remove the upper cylinder assembly.
5. Clean the new upper cylinder assembly and the surface of the flange before mounting, using cleaning kit.
6. Match phase of white arrow and marker (solder plated) on the rotary transformer (A) P.C. board, and mount the upper cylinder assembly. (Tightening torque 3 – 4kg.cm)
7. Perform the tape transport adjustment.

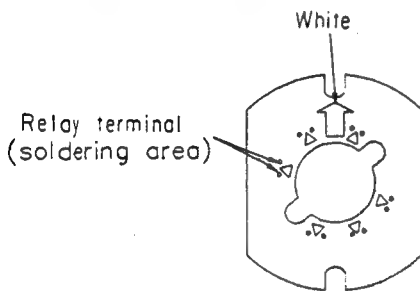


Fig. 4-2-1 Head relay P.C. board

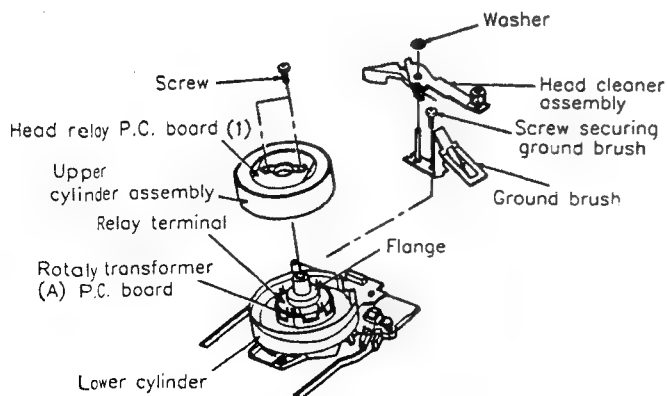


Fig. 4-2-2 Upper cylinder replacement

(2) Cylinder motor

< Check >

1. Supply the power to the cylinder motor directly.
2. If the motor is not rotated, replace the rotor and stator.

< Rotor replacement >

1. Remove two screws securing rotor and remove the rotor. (Tightening torque 3 – 4kg.cm)

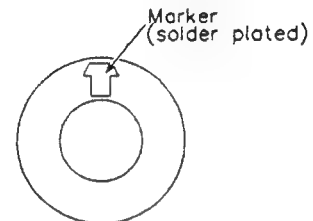


Fig. 4-2-3 Rotary transformer (A) P.C. board

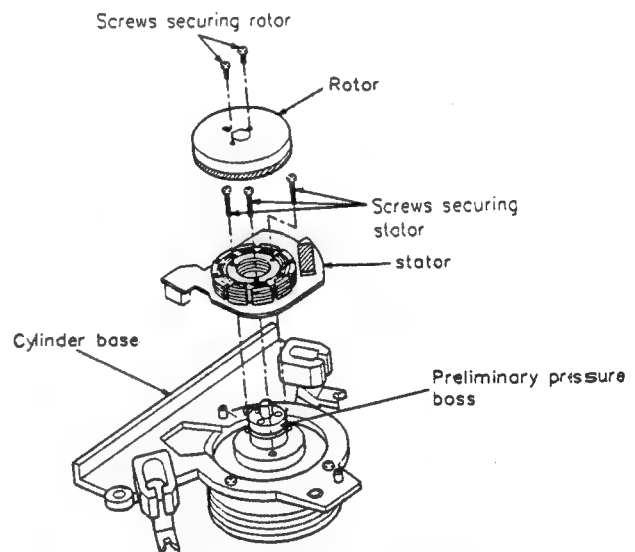


Fig. 4-2-4 Cylinder motor replacement

Note:

When mounting a new rotor, match phase decision holes of the rotor and preliminary pressure boss and then mount the rotor.

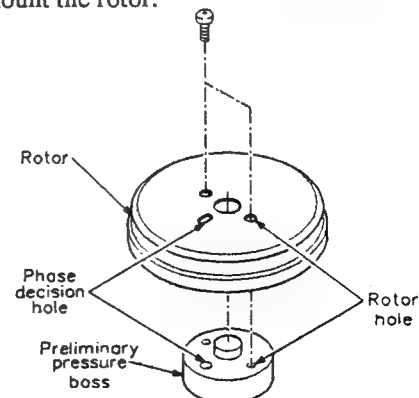


Fig. 4-2-5

< Stator replacement >

1. Remove the cylinder assembly. Refer to procedures for the cylinder replacement.
2. Remove two screws securing the rotor and remove the rotor. (Fig.4-2-4)
3. Remove three screws securing the stator.
4. Pull out the stator and replace it. (Tightening torque 1.5 – 2.5kg.cm)
5. Assemble the cylinder, using the procedures shown above in reverse order.
6. Adjust according to the tape transport adjustment procedures.

(3) Cylinder assembly

< Check >

1. Are there scratches on running surface of the lower cylinder?
2. Is upper cylinder rotating smoothly?
If abnormality is found in check above, replace the cylinder.

< Replacement >

1. Remove two screws securing preamplifier and remove the preamplifier.
2. Remove three screws.
3. Disconnect the connector.
4. Remove the cylinder assembly.

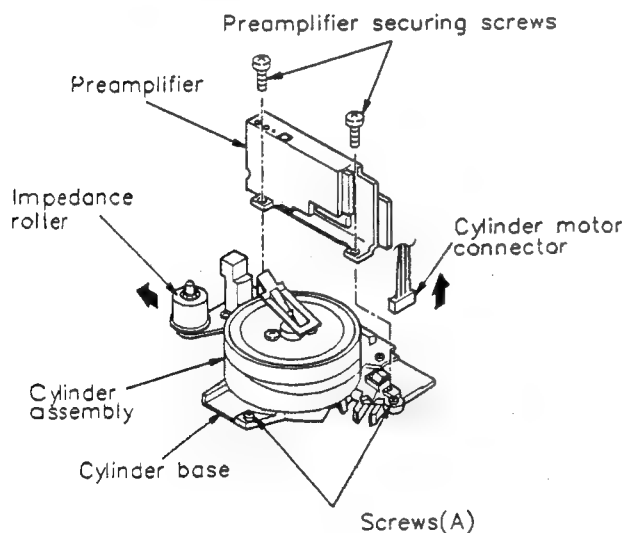


Fig. 4-2-6 Cylinder assembly replacement

Note:

Remove the cylinder assembly while pushing the impedance roller in direction shown by the arrow.

5. Position the cylinder base in place and mount the cylinder, using the procedures in reverse order. Take care not to damage the cylinder.
6. Adjust according to the tape transport adjustment procedures.

(4) Lower cylinder assembly

< Check >

1. Are there scratches on running surface of the lower cylinder?
2. Is abnormal sound heard during rotation of the cylinder?
3. Is flexible cable damaged?
If abnormality is found in above checks, replace the lower cylinder assembly.

< Replacement >

1. Remove the cylinder assembly, using procedures for cylinder replacement.
2. Remove the head cleaner assembly. (Refer to item 1-4-2 (5).)
3. Remove the ground brush.
4. Remove the ground cap.
5. Open upper lid of connector on cylinder base P.C board, and remove flexible cable.

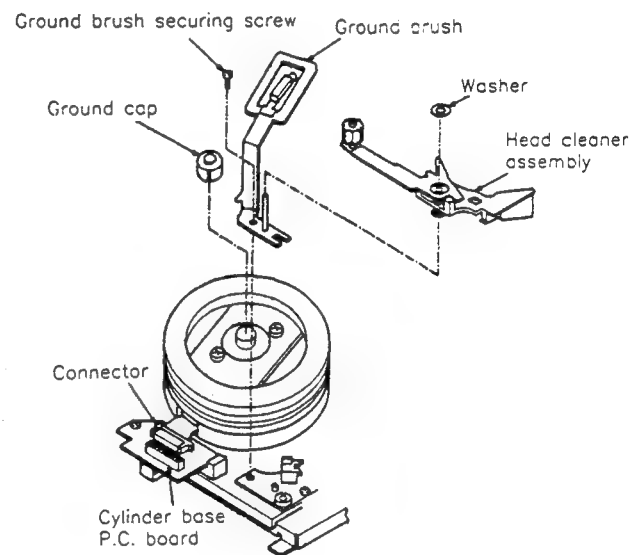


Fig.4-2-7

Note:

The upper lid of the connector can be removed by pulling it toward the lower cylinder assembly once and then rising it. (Refer to Fig.4-2-8.)

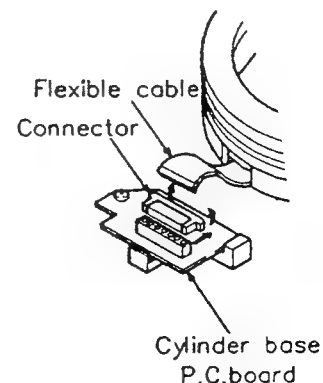


Fig. 4-2-8

6. Remove the rotor.
Refer to procedures < Rotor replacement >.
7. Remove the stator.
Refer to procedures < Stator replacement >.
8. Remove screw securing the cylinder base and remove the cylinder base.
9. Remove the upper cylinder assembly.
Refer to item 1-4-2 (1).
10. Replace the lower cylinder assembly.
11. Assemble the cylinder, taking care not to touch the video heads directly, or damage the cylinder.
12. Adjust according to the tape transport adjustment procedures.

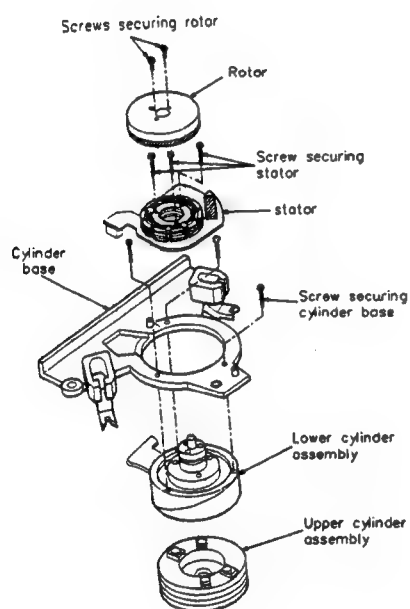


Fig. 4-2-9

(5) Head Cleaner Assembly Replacement

< Head Cleaner Replacement >

1. Remove the washer.
2. Remove the head cleaner assembly from the shaft of ground brush bracket.
3. Mount a new head cleaner assembly using the procedures in reverse order.

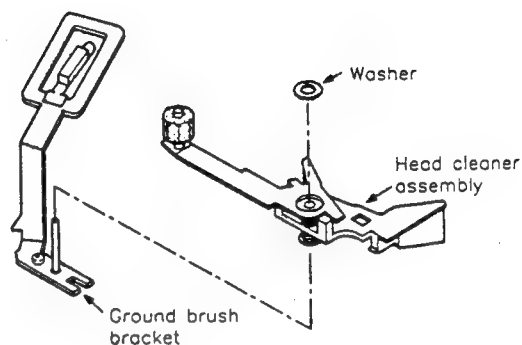


Fig. 4-2-10

< Cleaner (sponge part) replacement >

1. Remove the sponge part picking up with a tweezers, etc.
2. Mount a new sponge part using the removal procedures in reverse order.

Note:

Always replace the cleaner (sponge part) when the upper cylinder is replaced.

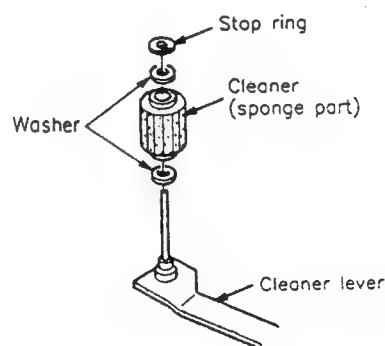


Fig. 4-2-11

Note:

- Pay attention not to make the surface of the sponge dirty.
- Clean the cylinder surface, if it is dirty.
- Take care not to bend metal part, when replacing the cleaner.

1-4-3. Transport System Parts Replacement

(1) ACE head assembly replacement

1. Disconnect the connector from the ACE P.C. board.
2. Remove the taper nut.
3. Remove the pinch lock spring and pinch connector so that they do not give trouble when removing the pinch roller from the ACE head.
4. Turn the ACE height adjusting nut counterclockwise and remove the nut in order to remove ACE base assembly. (Fig. 4-3-1)

Note:

Note positions of the ACE base and the taper nut.

4. Remove the E-ring and the ACE azimuth adjusting screw in order to remove the ACE head assembly.
5. Remove the ACE P.C. board from the ACE head assembly.
6. Replace the ACE head assembly, according to the reverse procedures.
7. Mount the taper nut, pinch lock spring and pinch connector.
8. Rotate the ACE height adjusting nut until the ACE base and the upper position of the taper nut have the same position as they were removed.
9. After mounting, perform the tape transport adjustment, starting from the first step.

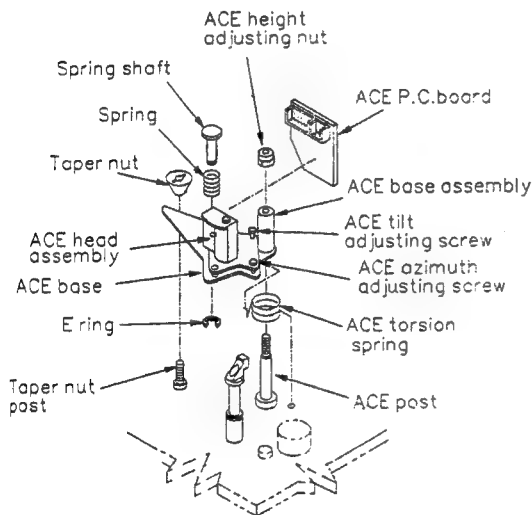


Fig. 4-3-1 Replacement of ACE head assembly

Note:

- Since direct mounting of the ACE torsion spring is difficult, first insert the tip of the spring into the hole on the main base and then hook the opposite tip of the spring to the ACE base which has been inserted into the ACE post.
- When replacing the ACE head assembly, always use an ACE head having the same part number. Do not use any other ACE head assembly.

(2) No. 8 guide sleeve replacement

1. Remove No. 8 cap and No. 8 guide sleeve in this sequence as shown in Fig. 4-3-2. When reassembling, perform the previous steps in reverse order.
2. To mount the No. 8 guide sleeve, insert the No. 8 cap onto the No. 8 post and push the cap downward while turning the cap left and right.

Note:

- No. 8 guide sleeve functions as the reference for tape transport, so the replacement should be made carefully.
- When mounting the No. 8 guide cap, mount the cap with its slant surface facing to cassette side.
- The guide sleeve has a directional characteristic, so take care when inserting it. Do not insert the sleeve upside-down. The lower flange thickness is higher than the upper flange thickness by about 1.6mm.

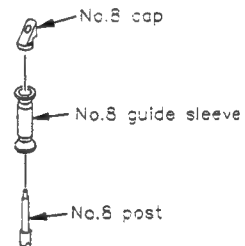


Fig. 4-3-2 No. 8 guide replacement

(3) FE head replacement

1. Disconnect the 2P connector of the FE head.
2. Remove the FE head mounting screw and the FE head can be removed. (Fig. 4-3-3)
3. Replace the new FE head and tighten the FE head mounting screw.
4. Connect the 2P connector.
5. Confirm whether the associated adjustments is not upset, starting check from the linearity adjustment, item 4) of the tape transport adjustment. (Refer to item 1-5-4 (3).)

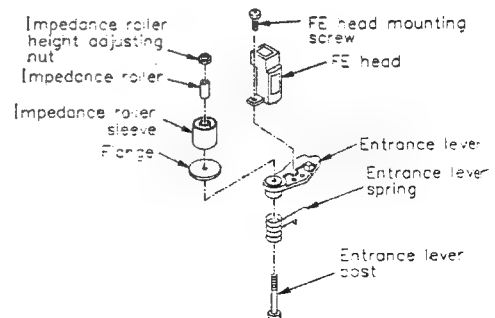


Fig. 4-3-3 Replacement of No. 3 guide and FE head

(4) Impedance roller replacement

1. Remove the impedance roller height adjusting nut and replace the impedance roller as shown in Fig. 4-3-3. Before removing the nut, note the number of threads or height exceeding the surface of the nut.
2. When mounting a new impedance roller, use the reverse procedures.
3. After replacement of the impedance roller, perform the adjustment from the linearity adjustment, item 4) in the tape transport adjustment. (Refer to item 1-5-4 (3).)

(5) S, T-guide rollers replacement

The same replacement procedures will be applied for both S and T-guide rollers.

1. Loosen the set screw shown in Fig. 4-3-4.
2. Turn the guide roller counterclockwise and remove it.
3. As the O-ring may stick to the guide roller when removed, remove the O-ring and install it on the new guide roller.
4. When remounting, perform the previous steps in reverse order.
5. After completion of the replacement, perform adjustment from the linearity adjustment item 4) in the tape transport adjustment. (Refer to item 1-4-5 (3).)

Note:

When tightening the set screw, temporarily tighten it with light pressure. If it is tightened too hard, associated adjustments can not be made.

The S-guide roller has a no mark on the upper flange and the T-guide roller has a black mark on upper flange. Do not exchange them when remounting.

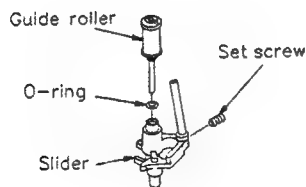


Fig. 4-3-4 Guide roller replacement

(6) S, T-sliders replacement

1. Remove the cylinder assembly.
2. Place the VTR vertically and remove the bottom cover.

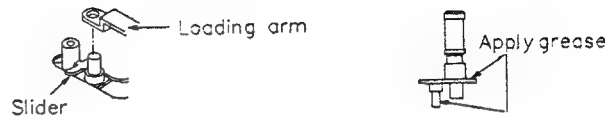


Fig. 4-3-5 S, T-slider replacement

3. Move the slider up to the loading position by turning the loading motor with your hand.
4. Remove the loading arm as shown in Fig. 4-3-5.
5. Remove the guide roller and reinstall it in a new slider according to the steps stated in (5).
6. When replacing the slider, perform the previous steps in reverse order.
7. After completion of the replacement, perform the rough adjustment in the tape transport system adjustment. (Refer to item 1-5-4 (3)).

Note:

When the slider is replaced, always apply grease to the slider receptacle as shown in Fig. 4-3-5.

(7) No. 9 guide lever assembly replacement

1. Remove the front loading assembly.
2. Remove the pinch lever assembly.
3. Remove the cam lever assembly.
4. Remove the loading drive assembly.
5. Remove the ACE head assembly.
6. Remove the nut and replace the No. 9 guide lever. In this case, note the number of threads exceeding the surface of the nut.
7. Reassemble the parts removed, using the reverse procedures. (Tighten the nut until the same thread number appears.)
8. After completion of the replacement, perform the adjustment from item 6) in the tape transport adjustment. (Refer to item 1-5-4 (3).)

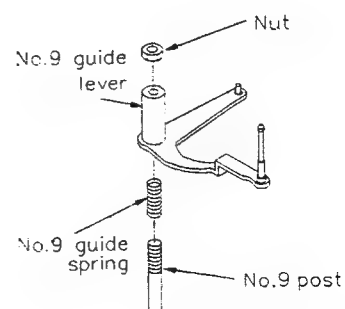


Fig. 4-3-6 No 9 guide lever replacement

1-4-4. Pinch Roller Assembly Replacement

1. Remove the pinch lock spring and disconnect the pinch connector.
2. Remove the stop ring and remove the pinch roller assembly upward.
3. Clean the pinch post and apply grease on it.
4. Replace the pinch roller assembly according to the previous steps in reverse order.
5. After replacement, make sure the T-sub brake is in touch with the T-reel table with a proper pressure.
6. After completion of the replacement, perform adjustment from item "1-5-4 (3) Tape transport system adjustment".

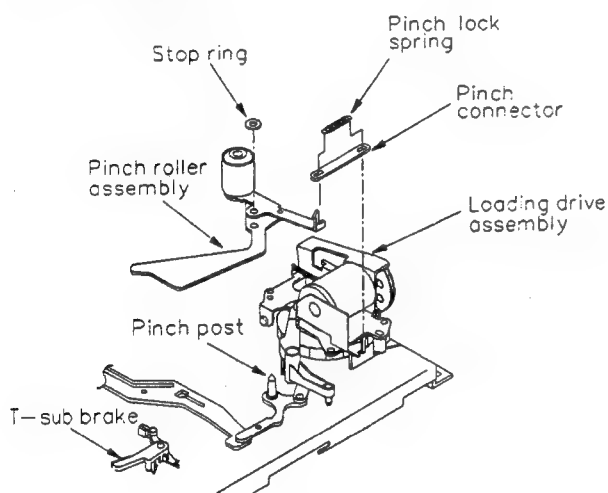


Fig. 4-4-1 Pinch roller replacement

1-4-5. Loading Motor Replacement

1. Remove the motor P.C. board from the loading motor, taking care not to damage the wire harness.
2. Remove the pinch lock spring and disconnect the pinch connector.
3. Off-hook the claw hooked on the main base, using a screw driver and remove the cam lever upward.
4. Remove the screws (A) and remove the loading drive assembly.
5. Remove the loading belt and screws (B), and remove the motor.
6. When replacing the motor with a new one, perform the previous steps in the reverse order, taking care of the polarities (+) polarity should be located on the bottom leftside. In this case, also mount the dew sensor with the motor, using the screws (B). Do not touch the surface of the sensor.

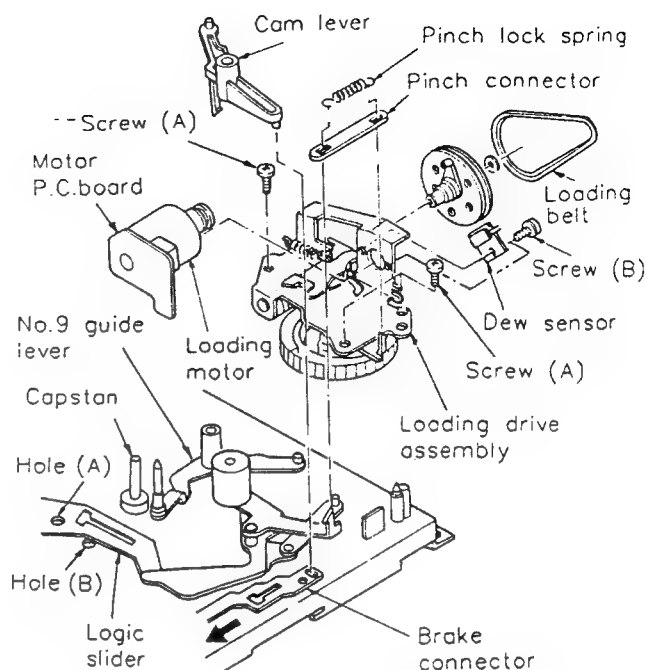


Fig. 4-5-1 Loading motor replacement

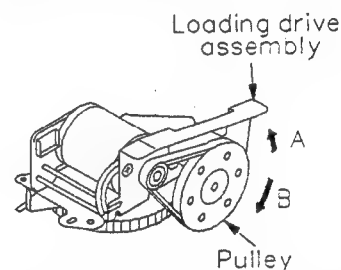


Fig. 4-5-2 Loading drive mounting mode

7. Turn the pulley of the loading drive assembly counterclockwise (as arrow A) until it stops, and then rotate it 3 turns clockwise (as arrow B) to set the mounting mode.
8. Before mounting the loading drive assembly on the main base, position the logic slider so that its hole matches the phase matching hole (A), and then move the No. 9 guide lever until it touches the capstan. As the phase matching hole (A) exists near the hole (B) (1.2cm right from hole (A)), do not mistake hole (B) for hole (A).
9. Slide the brake connector in the direction shown by the arrow, and mount the cam lever.
10. Mount the pinch connector and the pinch lock spring.

1-4-6. Tension Regulator Assembly

1. Remove the tape tension spring from the tension regulator assembly.
2. Remove the screw and remove the tension regulator assembly from the main base while releasing the S-soft brake lever.
3. Clean the shaft of the new tension regulator and then apply one or two drops of oil. When replacing the tension regulator, perform the previous steps in reverse order.
4. After completion of the replacement, check position of the tension pole and its adjustment (refer to item 1-5-2) and check the back tension (refer to item 1-5-3).

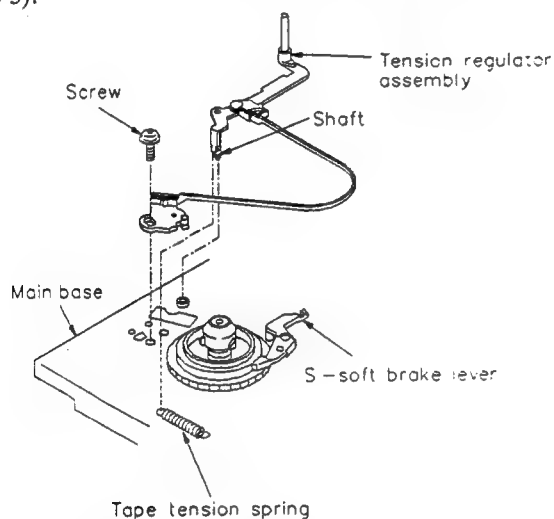


Fig. 4-6-1 Tension regulator assembly replacement

1-4-7. Cam Switch Replacement

1. Remove the screw and the cam switch assembly.
2. Apply grease to the boss section (lower than the cutout D) of the loading cam.
3. Position the cam switch assembly so that the hole (D) on the cam switch matches the cutout D on the loading cam, and then mount the cam switch with the screw.

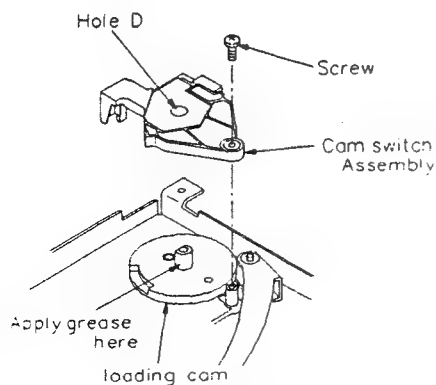


Fig. 4-7-1 Cam switch assembly replacement

1-4-8. T, S-Sensor Assemblies Replacement

1. Remove the mechanism main or sub P.C. board.
2. Desolder four sensor leads.
3. Unhook the holder claws from the P.C. board.
4. When reinstalling a new sensor, perform the previous steps in the reverse order.

Note:

Since the Hall element is glued on the sensor holder, take care the hall element is not torn off during installation.

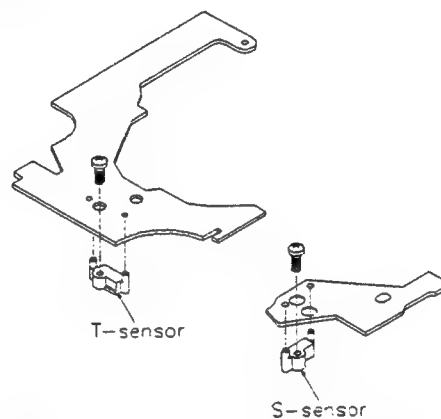


Fig. 4-8-1 Sensor assemblies replacement

1-4-9. Main Brake Assembly Replacement

1. The brake assembly has the mold claws which allow one touch installation or removal.

Note:

When replacing, take care not to touch the brake pad surface.

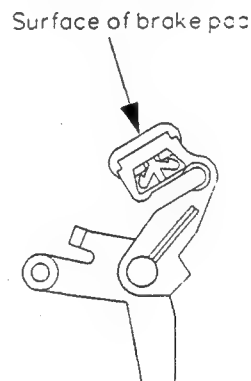


Fig. 4-9-1 Main brake assembly replacement

1-4-10. Ground Brush Replacement

1. Remove the screw and the brush.
 2. Clean the ground cap using alcohol.
 3. Replace the brush.
- Mount a new brush so that it can contact the center of the ground cap.

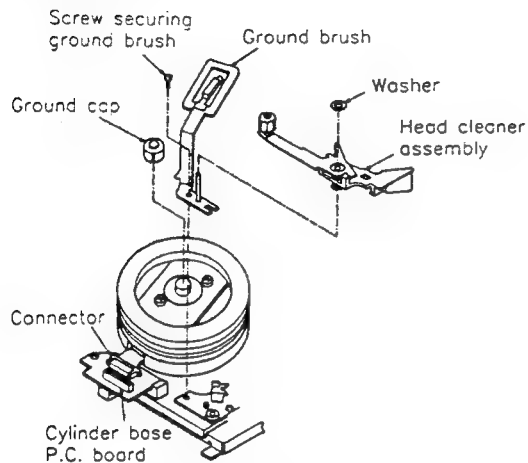


Fig. 4-10-1 Brush replacement

1-4-11. Reel Table Replacement

(1) Supply reel table assembly

1. Remove the tape tension spring from the tension regulator assembly. (Also remove the mechanism sub P.C. board.)
2. Remove the screw and remove the tension regulator assembly.
3. Remove the S-reel table assembly upward paying attention not to miss the washer while releasing the S-soft brake lever in the direction shown by the arrow.
4. After cleaning the reel shaft with a cleaning kit, lubricate it with one or two drops of oil.
5. When reinstalling the S-reel table assembly to the deck, make sure the washer is replaced on the reel shaft.

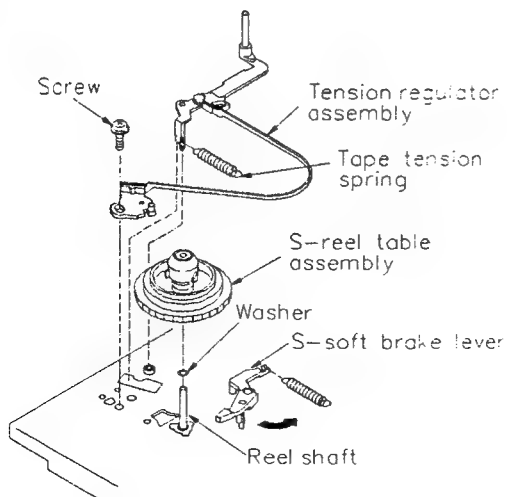


Fig. 4-11-1 Supply reel table assembly replacement

6. Mount the tension regulator assembly.
7. Hook the tape tension spring onto the tension regulator assembly.

Note:

In this case, take care not to give permanent deformation to the spring.

(2) Take-up reel table assembly

1. Remove the pinch lock spring.
2. Remove the pinch connector.
3. Remove the pinch roller assembly.
4. Remove the reverse brake spring from the reverse brake assembly.
5. Remove the reverse brake assembly from the main base. In this case, move the reverse brake in the direction shown by the arrow to remove the brake assembly at a larger hole of the main base.
6. Remove the T-reel assembly.
7. As the bearing is stained with oil, the washer may stick to the T-reel table assembly and be removed with it. Take care not to miss them.
8. Clean the reel shaft using a cleaning kit, and apply one or two drops of oil after the reel shaft has dried.
9. Replace the take-up reel with a new one.

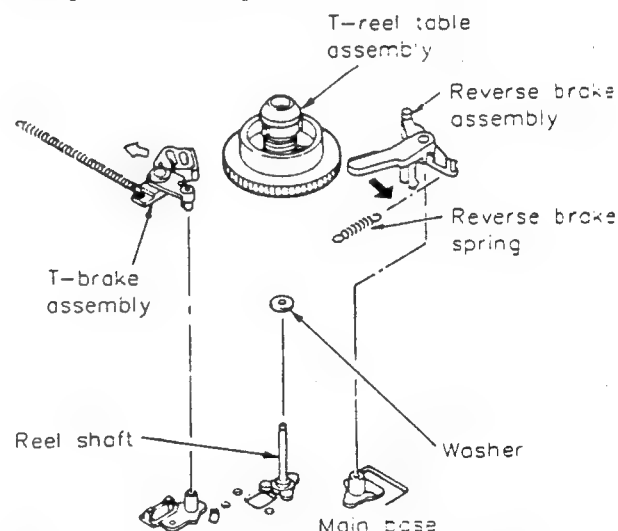


Fig. 4-11-2 Take-up reel table assembly replacement

1-4-12. Direct Gear Assembly Replacement

1. Turn the deck upside-down and remove the reel belt.
2. Remove the flat cable (FFC) and the main relay P.C. board. (Refer to item 1-4-15 (1).)
3. Remove the gear lever spring.
4. Remove the stop ring (1) and remove the gear lever upward.
5. Remove the stop ring (2), and remove the direct gear assembly from the gear lever, taking care not to miss the washers.
6. Clean the gear post, using the cleaning kit. Apply one or two drops of oil.
7. When replacing the direct gear assembly and mounting the gear lever, make sure the washers are replaced on the gear post.
8. Apply grease to the lever post and then mount it in the reverse order.

Note:

- When inserting the stop ring (2), hold the under side of the gear post.
- When installing the gear lever spring, take care of the direction of the hook.
- Take care that the gear lever spring is not positioned over the release lever.
- Take care that the gear lever spring is not positioned over the drive base stopper.

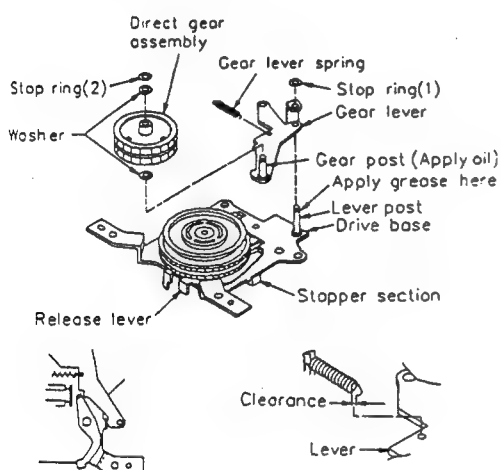


Fig. 4-12-1 Direct gear assembly replacement

1-4-13. Clutch Assembly Replacement

1. Turn the deck upside-down and remove the reel belt.
2. Remove the stop ring, and remove the clutch assembly upward. Take care not to miss the washers.
3. Clean the clutch post using the cleaning kit, and then apply one or two drops of oil.

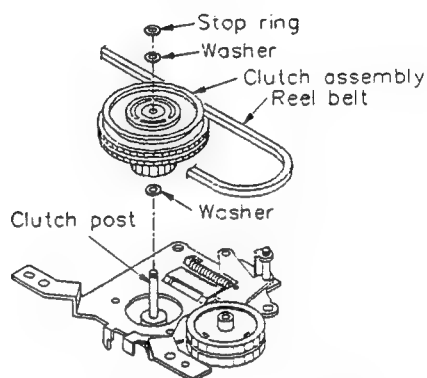


Fig. 4-13-1 Clutch assembly replacement

4. When replacing the clutch assembly and mounting it on the deck, make sure the washers are replaced on the clutch post.
5. When remounting, use the reverse procedures. (When mounting the belt, take care that the belt is not twisted.)
6. Check the reel torque, using the torque cassette.

1-4-14. Idle Gear Assembly Replacement

1. Turn the deck upside-down.
2. Remove the clutch as stated in item "1-4-13. Clutch Assembly Replacement".
3. Remove the direct gear assembly from the gear lever as stated in item "1-4-12. Direct Gear Assembly Replacement".
4. Place the deck in normal position.
5. Remove two screws.
6. Replace the idle gear assembly with a new one, using the reverse procedures. In this case, assemble the idle gear assembly with the shaft space (between the clutch post and gear post) set as $33.2^{+0.1}_{-0.05}$ mm. (When mounting the belt, take care that the belt is not twisted.)
7. Check the reel torque, using the torque cassette.

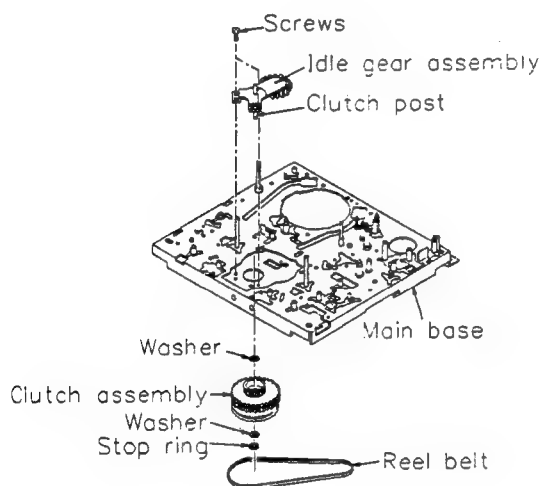


Fig. 4-14-1 Idle gear assembly replacement

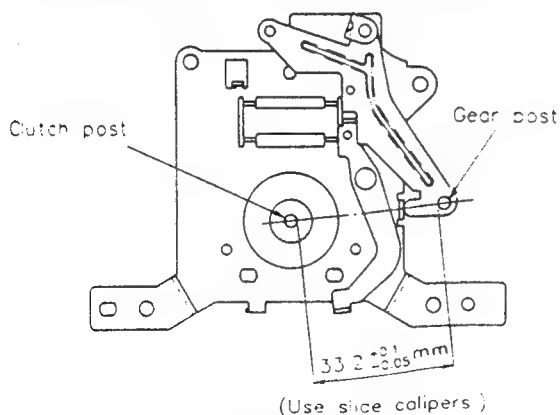


Fig. 4-14-2

1-4-15. Mechanism Relay P.C. Board Replacement

(1) Mechanism main P.C. board replacement

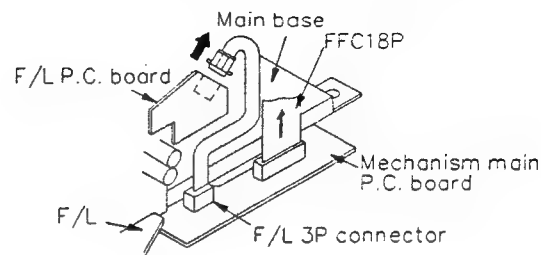


Fig. 4-15-1 Main P.C. board replacement

1. Pull and disconnect the FFC18P connector in direction shown by the arrow from the mechanism main P.C. board. Next, disconnect FL3P connector from the F/L P.C. board of by pulling it in direction shown by the arrow.
2. Disconnect FFC5P from the mechanism assembly, rear side by pulling it in direction shown by the arrow. Next, remove the F/L belt and the reel belt. (Fig. 4-15-3)

Note:

The F/L belt and the reel belt are different in their length, so paying attention when replacing them.

3. When disconnecting the FFC6P and the FFC10P, refer to the disconnecting method shown in Fig. 4-15-2.

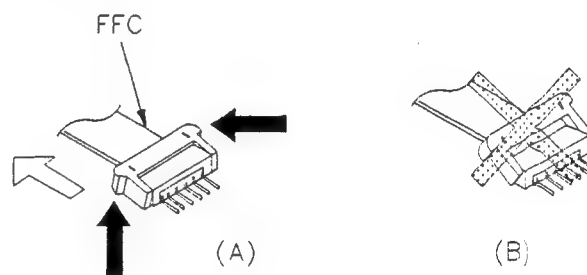


Fig. 4-15-2

< How to disconnect the flat cable from the FFC connector locked >

Hold the protruded parts (shown by the black arrows) of the connector and pull the connector in the direction shown by the white arrow to release the lock. Then, pull the FCC (flat cable) and the cable will be removed. Don't pull the connector as shown in Fig. 4-15-2 (B). If pulled strongly in the direction to be opened, the cable will be damaged. When connecting, insert the cable with the metal terminal side facing down and then use previous steps in reverse order.

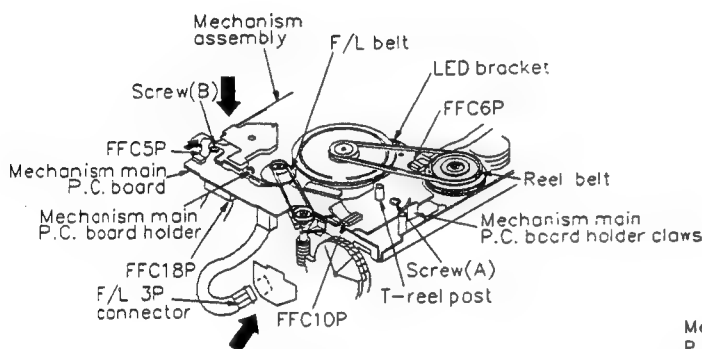


Fig. 4-15-3

4. Remove screw (A) and screw (B).
(Since the screws are different each other, paying attention when replacing them.)
5. Press and bend claws of the LED bracket in direction shown by the black arrows on upper side of the mechanism assembly, and then push them in direction shown by the white arrow so that they can pass the hole (Fig. 4-15-4).

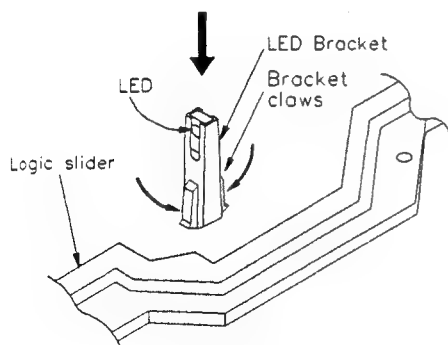


Fig. 4-15-4

6. Unhook the mechanism main P.C. board from the mechanism main P.C. board holding claws on the front mechanism assembly and lift the mechanism main P.C. board slightly. (Fig. 4-15-5 and 4-15-6)
7. Turn the mechanism main P.C. board in the direction shown by the shaded arrow as shown in Fig. 4-15-7, and remove the P.C. board from the mechanism main P.C. board holder section. In this case, the P.C. board will close to the F/L worm bracket, so slightly lift the P.C. board so that the P.C. board does not touch the worm bracket. Also take care not to damage the main P.C. board holder. Finally, remove the mechanism main P.C. board, paying attention not to touch the reel post.

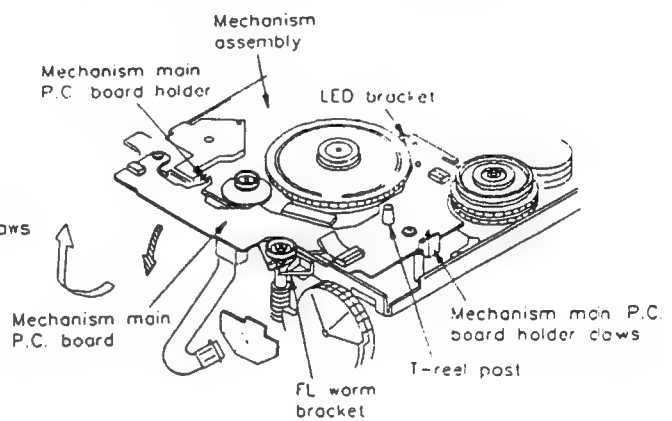


Fig. 4-15-5

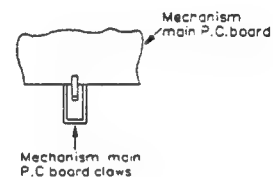


Fig. 4-15-6

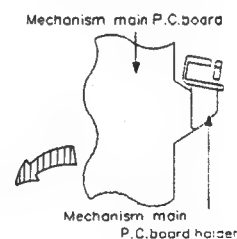


Fig. 4-15-7

Note:

When removing or remounting, take care that the LED is not contaminated by grease or damaged by scratches. (Fig. 4-15-4)

8. When mounting, insert the LED section onto the LED bracket hole so that the claws of the LED bracket do not engage the main base completely (Fig. 4-15-8). Next, mount the P.C. board on the T-reel post and the mechanism main P.C. board holder section securely, using the previous steps in reverse order. In this case, take care that FFC5P, FFC6P, and FFC10P are not jammed between the parts.
9. Hereafter, mount the parts in reverse procedures. In this case, route the FFC6P as shown in Fig. 4-15-9.

Note:

Take care the reel belt does not touch the flat cables, etc.

Also take care the reel belt and the F/L belt are not twisted when they are installed.

10. After the replacement, make sure all parts such as connectors, belts, etc. are mounted without missing any parts. Improper connection or installation, etc. may cause erroneous operation.

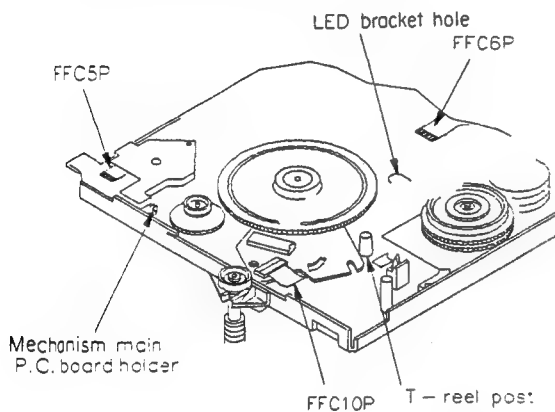


Fig. 4-15-8

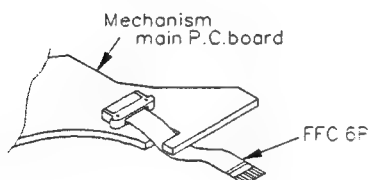


Fig. 4-15-9

(2) Mechanism sub P.C. board replacement

1. Disconnect the flat cable (which connects the main and the sub P.C. board) from the connector on the sub P.C. board.
2. Remove the screw.
3. Remove the sub P.C. board while opening the claws securing the sub P.C. board. In this case, take care not to damage the lens of the end sensor mounted on rear of the sub P.C. board.
4. When mounting, use the reverse procedures. Mount the sub P.C. board while turning the erase prevention lever in the direction shown by the arrow.

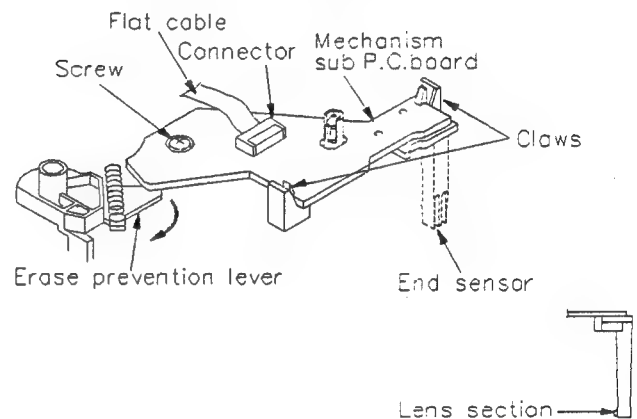


Fig. 4-15-10

1-4-16. Capstan Motor Replacement

1. Turn the deck upside-down.
Remove the F/L belt, reel belt, FFC (3) for cam switch, FFC (4) for mechanism sub P.C. board, and FFC (5) for capstan motor.

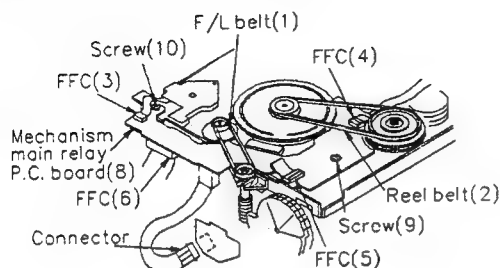


Fig. 4-16-1

2. Replace the deck in normal position.
Remove the FFC (6) for unit main P.C. board, and then disconnect the connector extending from the mechanism main relay P.C. board to the F/L.
3. Remove screws (9) and (10) from the rear of the deck, and remove the mechanism main relay P.C. board. (For more details, refer to item "1-4-15. Mechanism Relay P.C. Board Replacement". (Screws (9) and (10) are not the same, so do not exchange when using.)
4. Remove the FFC (3) from the capstan motor by sliding the connector holder in the direction shown by the arrow.

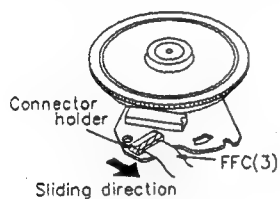


Fig. 4-16-2

5. Hold the capstan motor on the rear of the deck.
Remove three screws on the front side of the deck and then remove the motor.

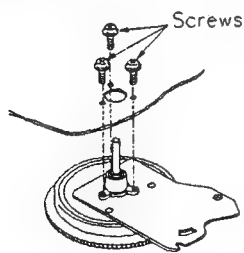


Fig. 4-16-3

6. Replace the capstan motor with a new one having the same part number.

7. First, position the capstan motor so that its direction matches to its receptacle as shown in the Fig. 4-16-4 and then mount the motor from the rear side of the deck, taking care not to damage the shaft, motor, etc. Particularly take care not to damage the F/L drive gear.

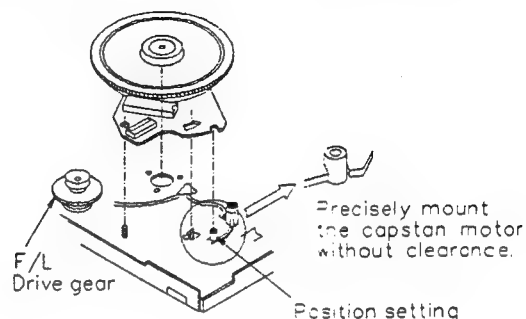


Fig. 4-16-4

8. Next, secure the capstan motor with three screws from the upper side of the deck. In this case, do not use the screws once removed. Precisely mount the motor without any clearance.

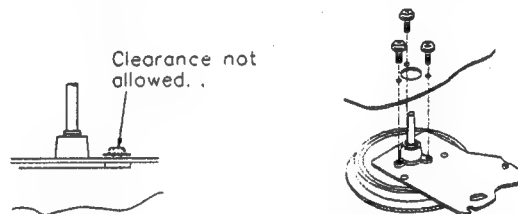


Fig. 4-16-5

9. Connect the FFC to the motor, taking care of its top and bottom side. It should be inserted with the metal terminal side facing downward. Insert the FFC and securely lock the connector by moving it as shown by the shaded arrow.

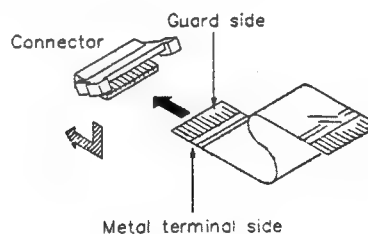


Fig. 4-16-6

10. Hereafter, proceed the remounting, using the mounting procedures in the reverse order.
When remounting, take care that the capstan motor, reel belt, FFC, etc. are not in contact with each other. Also take care that the belt is not twisted.
11. After completion of the capstan motor replacement, check the transport characteristics according to the transport adjustment procedure. (Refer to item 1-5-4 (3).)

1-5. Check and Adjustment

1-5-1. Phase Matching of Loading Gear

1. Turn the pulley of the loading drive assembly in a counterclockwise direction (viewed from the motor shaft) until it stops, to set the loading gear to the mounting position.
(If the turning of the pulley is difficult, disconnect the connector from the motor P.C. board and apply a voltage of 7V to pins 1 and 2.)
2. Move the S, T-sliders and tension lever to the unloading positions.

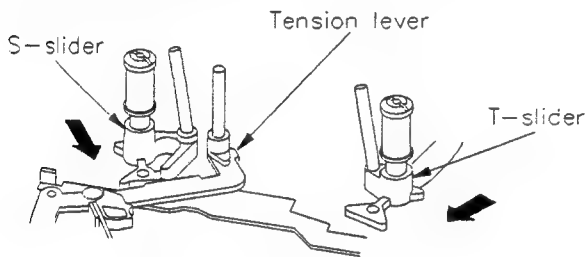


Fig. 5-1-1 Unloading position

3. Mount the T-loading gear and T-loading link assemblies on the boss provided at the T-slider (capstan side).
4. Align the two delta marks to fit the T-loading gear and S-loading gear, and then mount the S-loading gear and S-loading link assemblies.

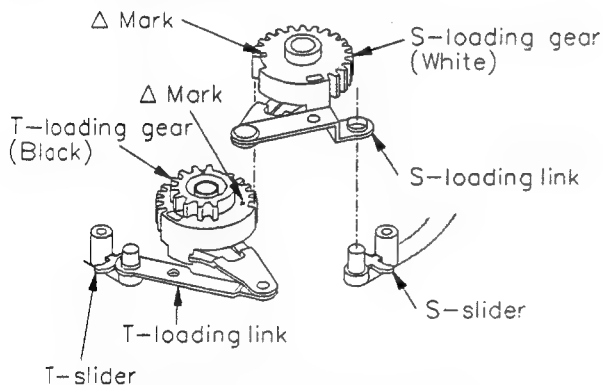


Fig. 5-1-2 Loading gear mounting

5. Align the engraved mark of the loading arm and the circular hole of the T-loading gear, and then mount the loading arm.

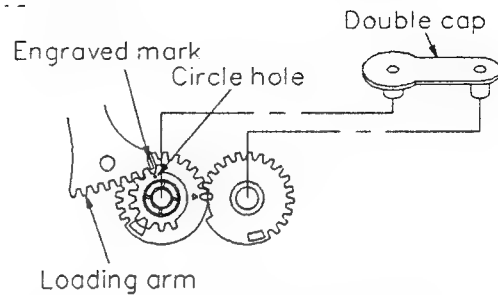


Fig. 5-1-3 Loading gear phase matching

6. Mount the double cap (larger side) to the T-loading gear side.
7. After the mounting of the parts, turn the pulley of the loading drive assembly 2 – 3 turns in the clockwise direction viewed from the motor shaft.

1-5-2. Check and Adjustment of Tension Pole Position

1. Set the deck to play mode with the front loading assembly removed.
2. Make sure the left end of the tension sleeve is $8 \pm 0.5\text{mm}$ away from the main base edge as illustrated.
3. If necessary, loosen the screw and adjust the mounting position of the band bracket.

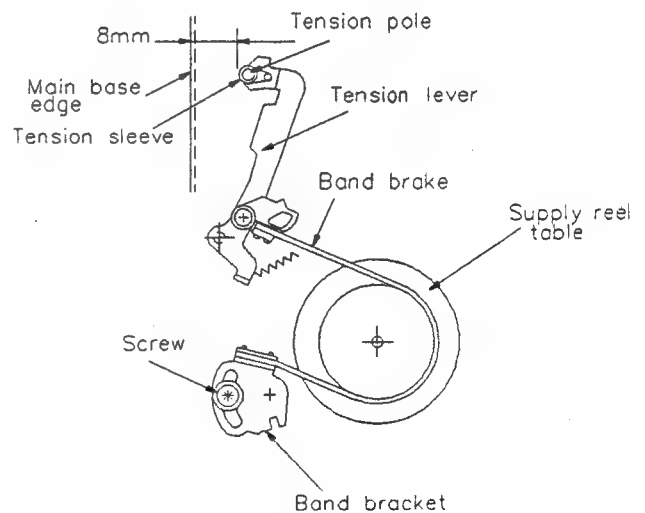


Fig. 5-2-1 Tension pole position

1-5-3. Reel Torque

(1) Reel torque

1. REVIEW mode

Excessive torque will cause damage to the tape during REVIEW mode. On the other hand, poor torque may not wind the tape.

2. Record/Playback (take-up side) mode

Too little torque does not rewind the tape to the end. If too large the tape may be stretched by excessive tension.

3. Inspection

Rewind the torque cassette (recorded in SP mode) to the end, then check the torque values shown below.

Review $160 \pm 20\text{g-cm}$

Record/Playback $70 - 130\text{g-cm}$

For checking the method, refer to the following item "(2) Reel torque check".

(2) Reel torque check

1. First, record a TV broadcast program on the entire torque cassette tape (KT-300NR) in the SP mode.
2. Load the torque cassette in the VTR and feed forward the tape before proceeding with measurement.
3. Set the VTR to the REVIEW mode and feed the tape for about 15 sec., and then make sure the take-up torque of $160 \pm 20\text{g-cm}$ is obtained while observing the left torque meter.
4. After completion of step 3, set the VTR to the PLAY mode and feed the tape for about 30 sec. Read the right torque meter and check the torque of $70 - 130\text{g-cm}$ is obtained.
5. When the review torque and playback torque are out of limit, replace the clutch assembly.
6. When the clutch assembly and the idle gear are replaced, perform the reel torque check.
7. Confirmation and adjustment of the back tension are performed by using a back tension cassette gauge. First, make sure that the tension pole is positioned correctly. (Refer to item 1-5-2). Load a back tension cassette and set the VTR to the PLAY mode. Make sure the meter is indicating $45 - 75\text{gf-cm}$. If the value is out of limit, first make sure the tension level spring is normal, and then replace the tension regulator assembly as required. (Refer to item 1-4-6).

PRECAUTIONS FOR USE OF TORQUE CASSETTE (KT-300NR)

1. Before loading a torque cassette in a VTR, always remove tape slack. The tape slack can be removed by rotating the reel to its take-up direction. (The tape tends to slack when there is no reel brake actions.)
2. When the torque cassette is loaded, confirm followings:
 - a. Make sure the tape does not ride up or over the No. 8 cap. If it does, do not eject the tape but bring the tape to its correct position, taking care not to damage the tape.
 - b. Make sure the tape is not slackened, if slackened, operate the VTR in FF or REW mode and then stop the tape. Then make sure the tape is not slackened again.
 - c. After above confirmation, proceed to the reel torque adjustments and confirmation.
3. Cautions for removal of torque cassette
 - a. When removing the torque cassette from the VTR, set the VTR to the STOP mode and wait for several seconds. Then, make sure the tape is not slackened. Push the EJECT button to remove the cassette.
 - b. When removing the torque cassette from the VTR, also make sure the tape is not slackened inside the cassette lid before pulling the cassette from the VTR. If the tape is slackened inside the lid, carefully bring the tape in place and then pull the cassette.
4. If the previous precautions 1, 2 and 3 are not performed properly, the tape may be damaged and correct measurements can not be performed.
5. Do not use worn out or damaged tape, if used they may damage video heads on the cylinder. In such a case always replace the tape with a new one. The replacement tape is of E-180 type, $6.01 \pm 0.3\text{m}$ in length.

1-5-4. Tape Transport System

The tape transport system has been precisely adjusted in the factory, so no check and alignment are necessary except the followings:

- Noises observed on the screen
- Tape damage
- Parts, shown in the adjustment procedures for the tape transport system, item 1-4-3, were replaced.

< Adjustment reference >

Lower flange height of No. 8 guide is used as the basic reference for the transport adjustment. To keep height of the No. 8 guide, do not apply excessive force onto the main base to prevent the main base from deformation.

(1) Location of tape transport adjustment

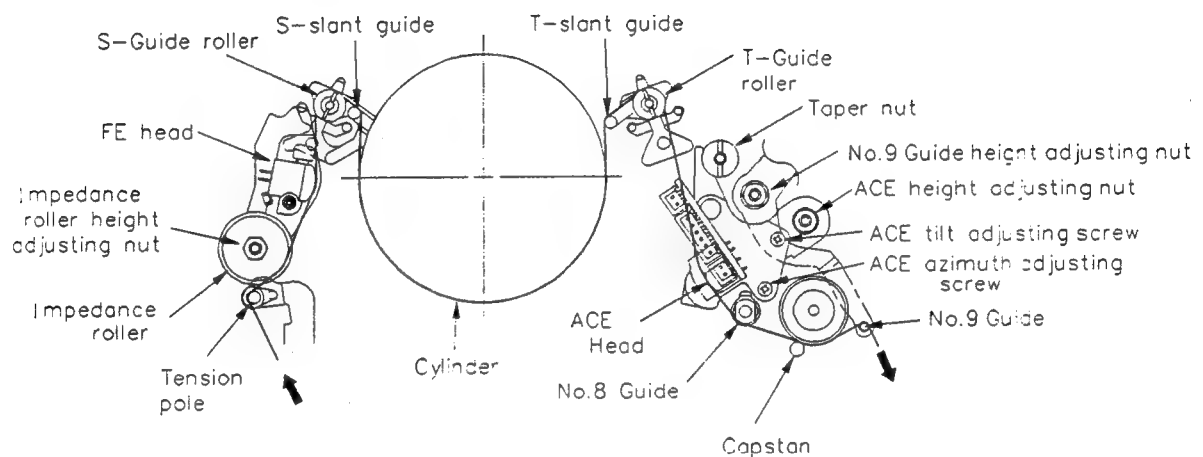


Fig. 5-4-1 Location of tape transport adjustment

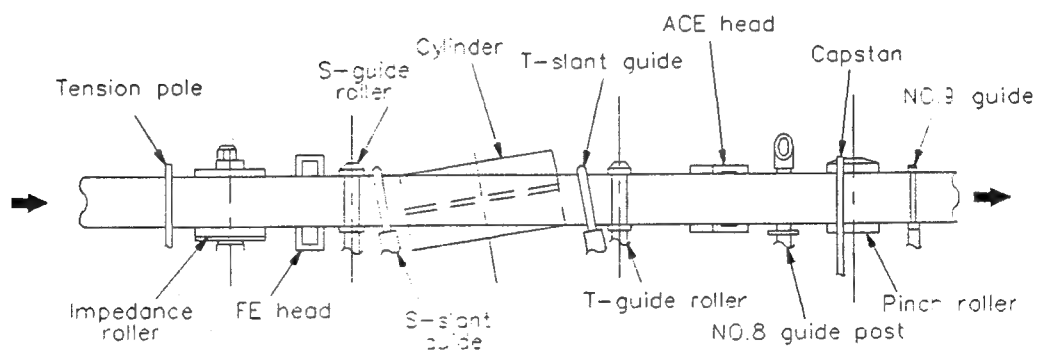
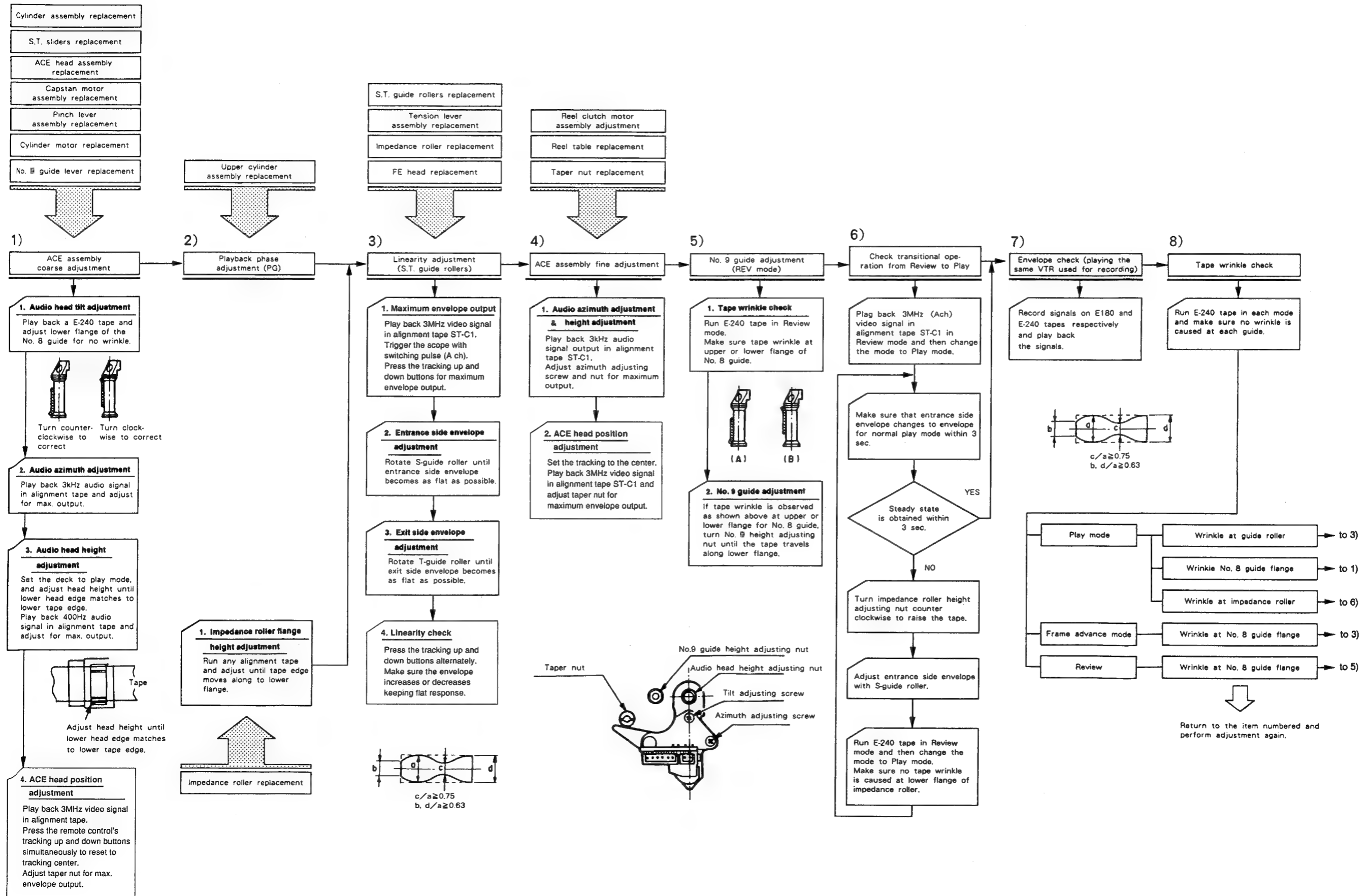


Fig. 5-4-2 Tape travel diagram

(2) Tape transport system adjustment flow chart



(3) Tape transport system adjustment

● Pre-adjustment

When the part(s) listed in Table 5-4-1 is replaced, perform required adjustments by referring to procedures for the tape transport system.

When the part(s) listed in Table 5-4-1 is replaced, the tape path may be changed and may damage alignment tape. To prevent this, first run a E-240 tape and make sure excessive tape wrinkle does not occur at each tape guide.

1. If tape wrinkle is observed at the lower flange of the impedance roller, decreases the lower flange height.
2. If tape wrinkle is observed at the S, T-guide rollers, turn the S, T-guide rollers until wrinkle disappears.
3. If the tape wrinkle is observed at the No. 8 guide, perform the tilt adjustment of the ACE head.

Table 5-4-1

Parts replacement	Adjustment procedure
<ul style="list-style-type: none"> ● Cylinder complete assembly ● S, T-sliders ● ACE head assembly ● Capstan motor assembly ● Pinch lever assembly ● Cylinder motor ● No. 9 guide lever assembly 	From item 1)
<ul style="list-style-type: none"> ● Upper cylinder 	From item 2)
<ul style="list-style-type: none"> ● S, T-guide rollers ● Tension lever assembly ● Impedance roller ● FE head ● No. 8 guide sleeve 	From item 3)
<ul style="list-style-type: none"> ● Reel clutch assembly ● Reel table (S, T) ● Taper nut 	From item 4)

● Adjustment procedures

1) ACE head assembly coarse adjustment

a. ACE tilt adjustment

1. Play back a E-240 tape and observe running condition of the tape at the lower flange of No. 8 guide.

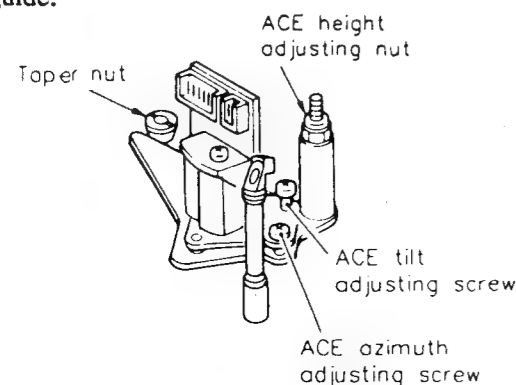


Fig. 5-4-3 ACE head assembly

2. Adjust the ACE tilt adjusting screw until tape wrinkle is caused at the lower flange of No. 8 guide as shown in Fig. 5-4-4(A).
3. Turn the ACE tilt adjusting screw counterclockwise until the tape travels along the lower flange as shown in Fig. 5-4-4(B).

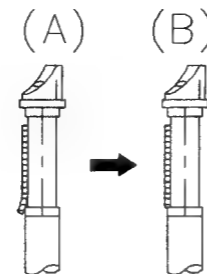


Fig. 5-4-4 No. 8 guide check

b. Audio azimuth adjustment

1. Play back the 3 kHz audio signal on the alignment tape ST-C1.
2. Connect a millivoltmeter to the audio line output terminal.
3. Turn the ACE azimuth adjusting screw to obtain maximum audio output.

c. Audio head height adjustment

1. Run the alignment tape (ST-C1) in the playback mode.
2. Observe surface of the audio head using a dental mirror.
3. Turn the ACE height adjusting nut so that lower tape edge matches to the lower edge of the control head.
4. Play back the 400 Hz audio signal in the alignment tape (ST-C1) and adjust the head height for maximum audio output.

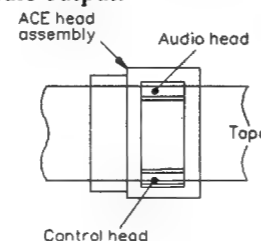


Fig. 5-4-5 Head height

d. ACE head position pre-adjustment

1. Play back the 3 MHz video signal in the alignment tape (ST-C1).
2. Press the remote control's tracking up and down buttons to reset to tracking center, and adjust the taper nut for maximum video signal output after the tracking control is set at its center position.

2) Playback phase adjustment

Perform the adjustment according to the methods stated in the electrical adjustment "Servo Circuit".

3) Linearity adjustment (S, T-guide rollers adjustment)

1. Play back the 3 MHz (A ch) video signal on the alignment tape. (ST-C1)
2. Observe the video RF signal envelope on an oscilloscope triggered by the video switching pulse.
3. Make sure the video envelope waveform (in its maximum output) meets the specification shown in Fig. 5-4-6.

Note:

- a = maximum output of the video RF envelope
- b = minimum output of the video RF envelope at the entrance side
- c = minimum output of the video RF envelope at the center point
- d = minimum output of the video RF envelope at the exit side

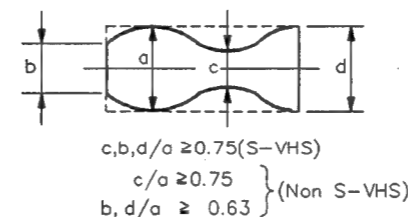


Fig. 5-4-6 Envelope waveform adjustment

4. If the A section in Fig. 5-4-7 does not meet the specification, adjust the S-guide roller in up or down direction.
5. If the B section in Fig. 5-4-7 does not meet the specification, adjust T-guide roller in up or down direction.

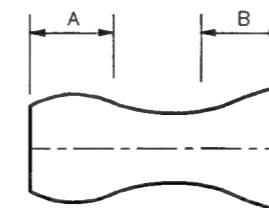


Fig. 5-4-7 Adjustment points

6. After completion of the adjustment(s), press the tracking up and down buttons and make sure video envelope variations are almost flat. Next, play back the 3MHz signal on the alignment tape (ST-C1) and make sure the video RF envelope variations are also flat when the tracking buttons are pressed.
7. If the envelope varies as shown in Fig. 5-4-8, adjustment of the S, T-guide rollers may be upset, if so perform the adjustment again.

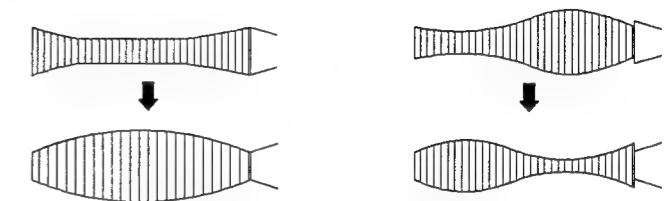


Fig. 5-4-8 Abnormal variation of the waveform

4) ACE head assembly fine adjustment

a. Tape wrinkle check at the lower flange of No. 8 guide

1. If tape wrinkle is observed at the lower flange of No. 8 guide, adjust the ACE tilt adjusting screw counterclockwise as shown in Fig. 5-4-3 until the wrinkle disappears.
2. If a gap is observed between the lower flange of No. 8 guide and the lower edge of tape, adjust the ACE tilt adjusting screw clockwise until the tape travels along the lower flange.

Note:

This adjustment should be made using a beginning part of E-240 tape.

b. Azimuth adjustment

1. Play back the 3 kHz audio signal on the alignment tape (ST-C1).
2. Adjust the ACE azimuth adjusting screw for maximum audio output as shown in Fig. 5-4-3.

c. Head height adjustment

1. Play back the alignment tape.
2. Adjust the ACE height adjusting nut for maximum audio output.

d. ACE head position adjustment

1. Play back the 3MHz (A ch) video signal on the alignment tape (ST-C1).
2. Press the remote control's tracking up and down buttons simultaneously to reset to tracking center.
3. Trigger the oscilloscope with the video switching pulse and observe the video RF envelope waveform.
4. Turn the taper nut slowly and fix the taper nut at the position where the video envelope reaches a peak level.

Note:

- If video RF signal is not observed with the tracking center, perform the ACE head adjustment to obtain maximum video RF envelope in each mode, again.

5. Play back the audio signal on the alignment tape (ST-C1) and make sure the audio output is maximum.

5) No. 9 guide lever adjustment

1. Set the VTR to Cue mode with E-240 tape (at beginning portion) loaded. Switch the Cue mode to the Review mode when the tape has been rewound into the T-reel table to some extent.
2. Check tape wrinkle at the upper and lower flange of No. 8 guide. Adjust the No. 9 height adjusting nut so that the tape runs along the lower flange.
3. Set the VTR to the Cue mode again and make sure the tape is not twisted between the capstan and the No. 9 guide. If twisted, adjust the No. 9 guide height and the adjustment in step 1 again.

Note:

When making the adjustment, do not mistake the ACE head height adjusting nut for the No. 9 adjusting nut.

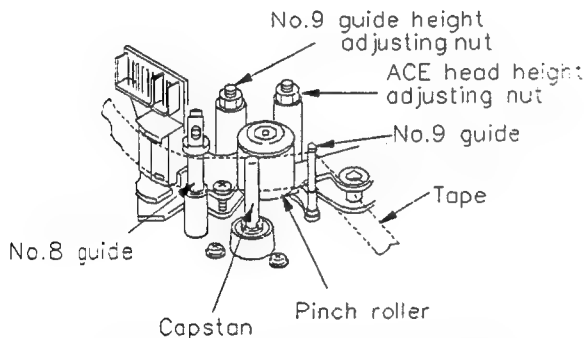


Fig. 5-4-9 No. 9 guide lever adjustment

6) Check for transitional operation from Review to Play

1. Play back the 3 MHz (A ch) white video signal on the alignment tape (ST-C1) in Review mode and observe the video RF envelope with the oscilloscope.
2. Switch the Review mode to the Play mode. When switched to the Play mode, make sure the entrance side envelope comes to an approximate steady state within 3 seconds as shown in Fig. 5-4-10.

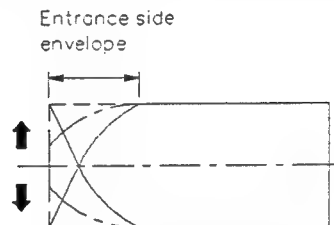


Fig. 5-4-10 Video envelope rising when operation mode is switch from review to play mode

If it does not rise within 3 seconds, adjust as follows:

3. Turn the impedance roller nut counterclockwise to adjust the lower flange height. Make sure the tape travels along the lower flange.
4. Since entrance side linearity varies as the height of the lower flange of the impedance roller is varied, adjust the S-guide roller to correct the linearity.
5. Change operation mode from the Review to the Play mode again and make sure the entrance side envelope rises within 3 seconds. If not, perform the adjustment again from item 3.
6. Play back the E-180 tape in the Play mode and make sure no tape wrinkle occurs at the lower flange of the impedance roller. If excessive tape wrinkle occurs, turn the impedance roller nut clockwise until the wrinkle disappears and then perform adjustment from item 4.

Note:

If the rising characteristic is poor in Review mode, screen noises may occur in synchronous editing recording. Perform the adjustment carefully.

7) Envelope check

1. Make recordings and play back on E-180 and E-240 tapes, and make sure the playback output envelope meets the specification shown in Fig. 5-4-6.
2. In playback using the same video deck as used for the recording, (with a E-180) the video envelope should meet the specification shown in Fig. 5-4-11.



$$\bullet B/A \leq 0.55$$

Fig. 5-4-11 Envelope output and output level difference

3. If the performance does not meet both specifications 1 and 2 above, replace the upper cylinder assembly.
4. Confirm operation of the synchronous editing, using a beginning portion of a E-180 tape.
5. If picture noises are observed at the starting position of the editing, adjust the height of the lower flange of the impedance roller again.

8) Tape wrinkle check

1. Play back the E-240 tape in the playback, Cue, Review and the frame feeding mode, and observe tape wrinkle at each guide.
2. If excessive tape wrinkle is observed at the mode shown below, perform the associated adjustments also shown below.
 - a. Playback mode
 - Tape wrinkle at the S, T-guide roller section
 - Item 3: Linearity adjustment
 - Tape wrinkle at No. 8 guide flange
 - Item 1: ACE head assembly coarse adjustment
 - Tape wrinkle at impedance roller flange
 - Item 6: Check for transitional operations from Review to Play
 - b. Review mode
 - Tape wrinkle at No. 8 guide
 - Item 5: No. 9 guide lever adjustment
 - c. Frame feeding mode
 - Tape wrinkle at No. 8 guide
 - Item 3: Linearity adjustment

2. ELECTRICAL ADJUSTMENT

< Test equipment required >

Adjustment will be performed with the following test equipment.

1. Color TV (Monitor)
2. Oscilloscope, 2 CHs, 15 MHz or higher with delay system
3. Frequency counter (7 digits or higher)
4. Millivoltmeter
5. Digital voltmeter
6. Tester (20 K ohm/V)
7. Audio generator
8. Audio attenuator
9. Alignment tapes
Part code: ST-C1: 70909227
10. Alignment screw driver (jig)
11. Color pattern generator
12. Video sweep generator

< Color bar signal >

Color bar signals of 75 % recorded on the alignment tapes are shown in Fig. 2-1-1.

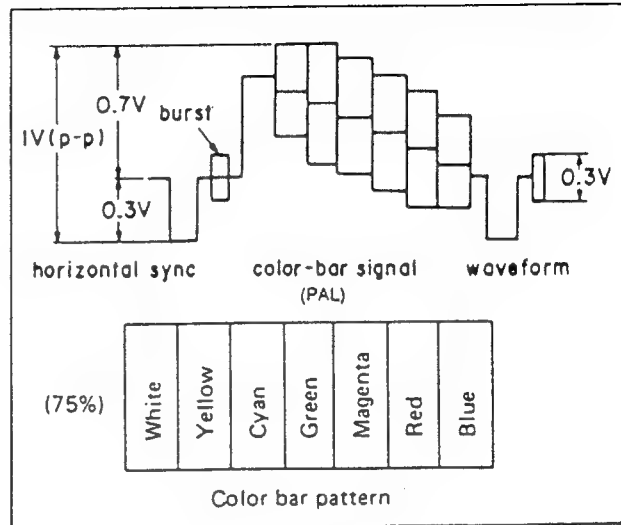


Fig. 2-1-1

<Specified input and output levels, and impedance>

Video input: Negative sync, standard composite video signal 1 Vp-p, 75 ohm
 Video output: Same as the video input 1Vp-p, 75 ohm
 Audio input: -8 dBs, more than 47 k ohm
 Audio output: -6 dBs, less than 4.7 k ohm

Alignment sequence

Proceed the alignments in the sequence as shown in Fig. 2-1-2.

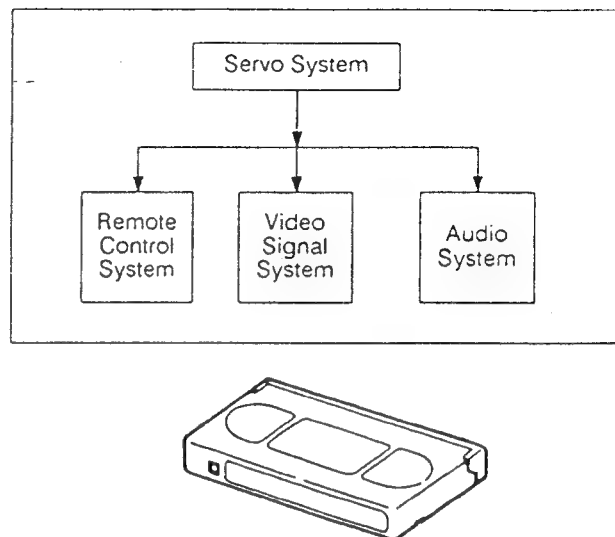


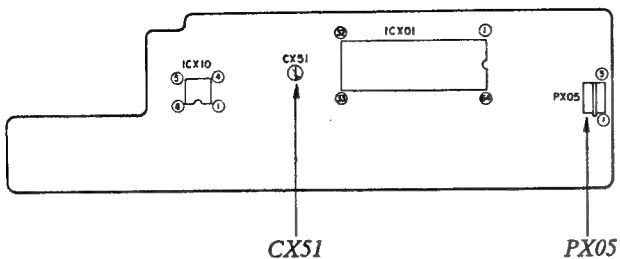
Fig. 2-1-2

Alignment tape specifications

[1] ST-C1

Segment	System	Playback Time (min.)	Video Signal	Audio Signal	Applications
1	PAL & SECAM	10	Mono Scope	1 kHz	Servo checks and adjustment
2	PAL & SECAM	10	3 MHz Ach	400Hz	Tape path checks and adjustment
3	PAL	5	Color bar	3 kHz	Video and Sound checks and adjustment
4	SECAM	5	Color bar	3 kHz	Video and Sound checks and adjustment
5	MESECAM	5	Color bar	3 kHz	Video and Sound checks
6	NTSC	5	Color bar	1 kHz	Video and Sound checks

2-1.Timer Circuit



Timer PC Board

2-1-1. Clock (32.768kHz) Adjustment

Test point: PX05

Test equipment: Frequency counter

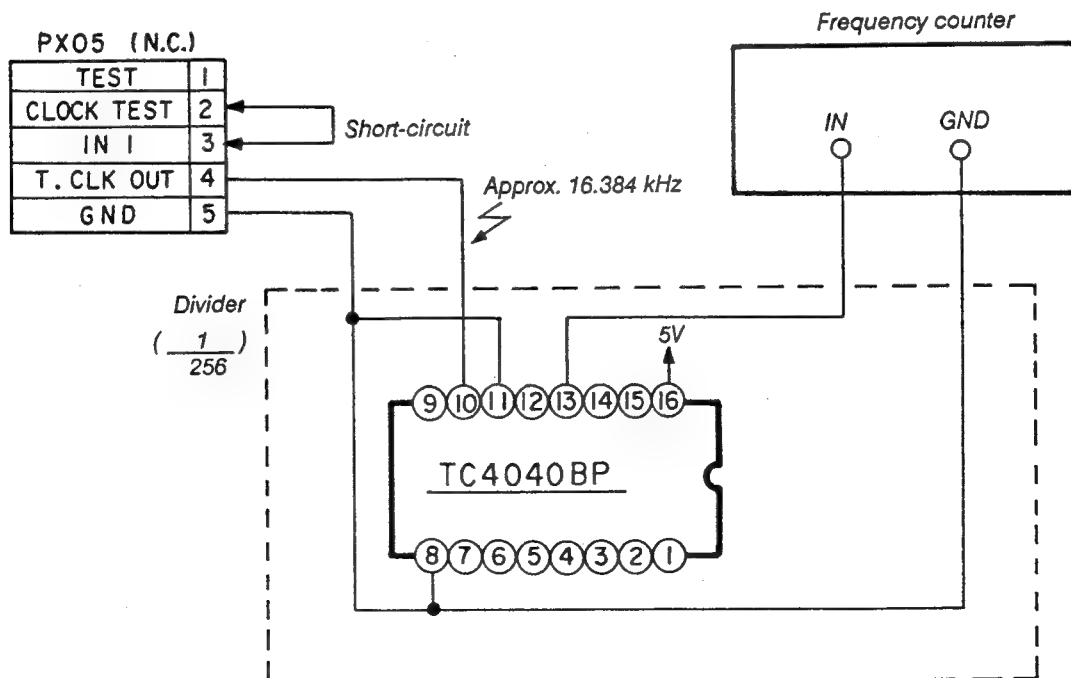
Adjusting point: CX51

1. Short circuit the pins 2 and 3 of PX05.
2. Connect the divider to pins 4 and 5 of PX05.
3. Connect the frequency counter to the divider.
4. Adjust CX51 so that the frequency counter shows the specified value shown in the table at right. Select a specified value from the table according to the room temperature.

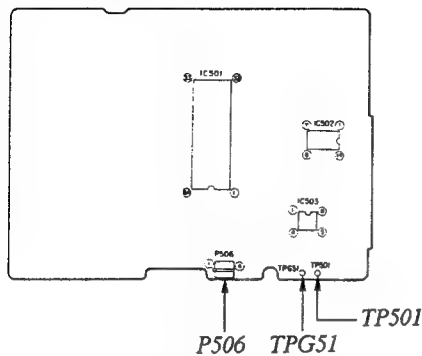
Note:

Perform the adjustment under room temperature of 16 °C ~ 34°C

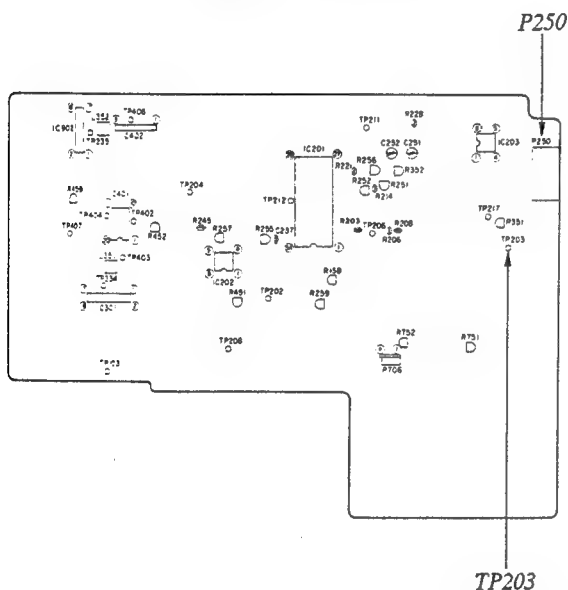
Room temperature (°C)	Specified value
16	63.9999 ± 0.0001
18	64.0001 ± 0.0001
20	
22	64.0002 ± 0.0001
24	
26	
28	
30	64.0001 ± 0.0001
32	
34	63.9999 ± 0.0001



2-2.Servo Circuit



Logic/Servo PC Board



Main PC Board

2-2-1. Playback Phase (PG)

Test point: Pin 2 of P506 (SW pulse),
TP203 (Video line out)

Test equipment: Oscilloscope

Adjusting point: TP501, TPG51

1. Press the tracking up button and tracking down button simultaneously during the play back (PAL SP mode) to set the tracking at the center.
2. Check that the phase difference between the falling edge of the SW pulse (pin 2 of P506) and the rising edge of the CTL pulse (pin 1 of P506) shows 13.5 ± 0.5 msec.
3. Observe the envelope waveform of pin 4 of P506 and make sure X adjustment and linearity adjustment are performed, and C-sync signal is input to pin 12 of IC501 during the playback mode.

4. Short circuit TP501 (PG TEST) and TPG51 (GND) for approx. 1 sec., and enter PG Auto adjustment mode.
5. Perform PG Auto adjustment for approx. 10 sec. During this adjustment, the FIP blinks and the mode transmission is not accepted.

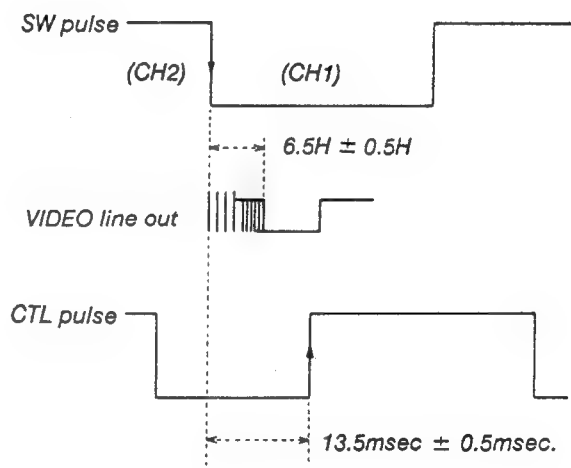
After adjustment:

After 10 sec. of FIP blinking, stop blinking operation on the FIP and FIP enters into the normal display mode → still mode for 1 sec. (after approx. 2 sec. of audio mute) → enter into the play back mode.

NG adjustmnet:

FIP continues to display play mode. All the display item is lightning.

6. Make sure the display shows the play mode.
Between the falling edge and standing edge of the SW pulse show $6.5H \pm 0.5H$ from the V-sync front edge of the video signal.



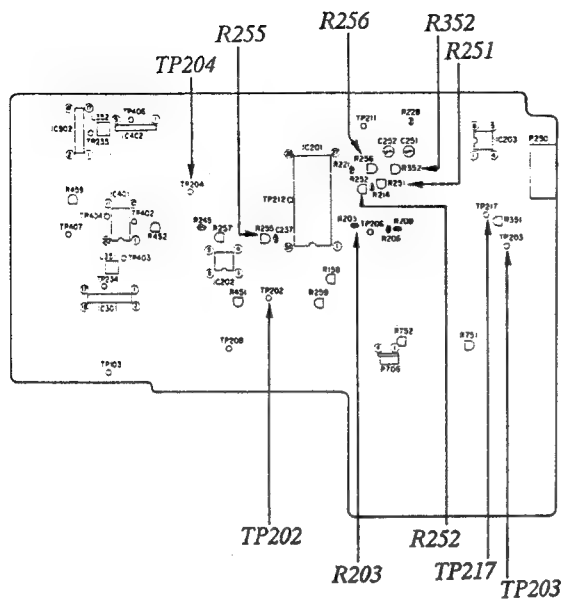
2-2-2. Pseudo V

Test equipment: Color monitor

Adjusting point: Tracking button

1. Play back the monoscope or color bar signal on the alignment tape ST-C1.
2. Adjust tracking up and down button to stop the center part of the screen in the still mode.

2-3.Video Circuit



Main PC Board

Note:

- * Place the RENTAL/EDIT/HQ switch in the HQ position.
- * Except otherwise specified, place the Video System SW in the AUTO position.
- * The line output terminals should not be loaded.

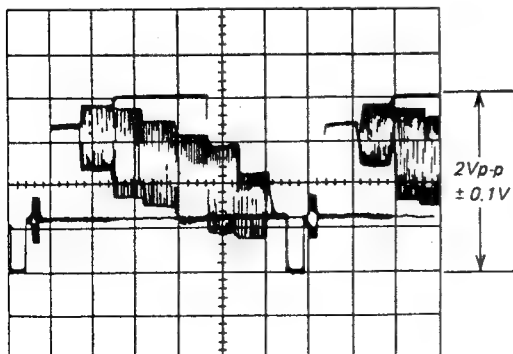
2-3-1. Video AGC Level

Test point: TP204, TP217

Test equipment: Oscilloscope

Adjusting point: R255

1. Feed a color bar signal (PAL) to the line input terminals and set the VTR to the EE mode.
2. Connect the oscilloscope to TP217 and trigger the scope with HD pulse at TP204. Adjust the scope so that a waveform is displayed for 2H period.
3. Adjust R255 until amplitude of $2.0V_{p-p} \pm 0.1V$ is obtained between sync tip and 100% white level.



2-3-2. Sync Tip Frequency

Test point: TP202

Test equipment: Frequency counter

Adjusting point: R251, R352

1. Short circuit the line input terminals with a phone jack and set the VTR to the REC mode.
2. Connect the frequency counter to TP202.
3. Place the Video System SW in the PAL/MESECAM position. Adjust R251 to obtain frequency reading of $3.80 \pm 0.1MHz$.
4. Place the Video System SW in the NTSC position. Adjust R352 to obtain frequency reading of $3.40 \pm 0.1MHz$.

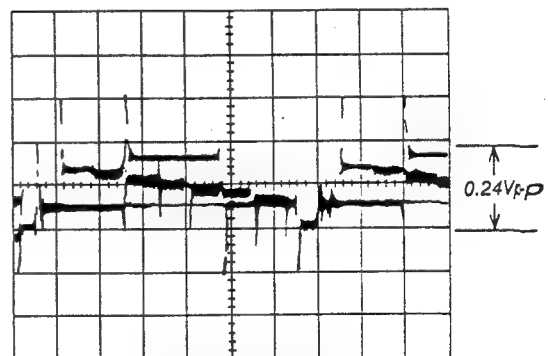
2-3-3. FM Deviation

Test point: R203 (R252 side), TP203, TP204

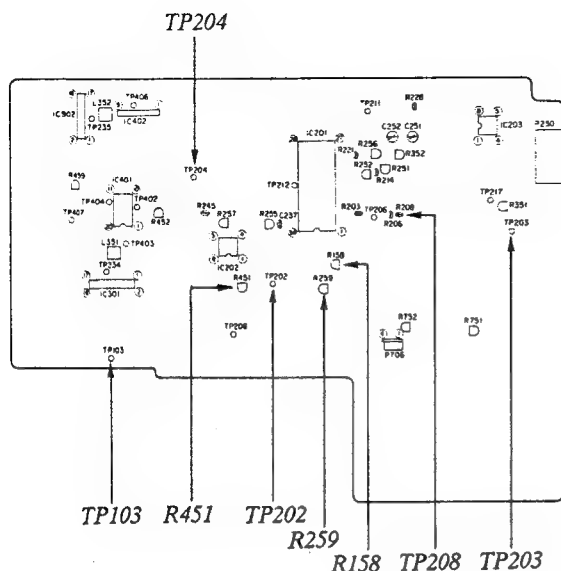
Test equipment: Oscilloscope

Adjusting point: R252, R256

1. Feed the color bar signal (PAL) to the line input terminal.
2. Connect the oscilloscope to R203 (R252 side) and trigger the scope with a HD pulse at TP204. Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R252 to obtain the amplitude of approx. $0.24V_{p-p}$ between the sync tip and the white peak. After adjusting R256 (Play back Y signal output level) with the method 2-2-10, repeat above adjustment procedures, and then adjust R252 (FM deviation control) so that the playback Y signal output level at TP203 shows $2.0 \pm 0.15V_{p-p}$.



Horizontal axis: 10ms/div.
Vertical axis: 0.05V/div.



Main PC Board

2-3-4. REC FM Level

Test point: TP202

Test equipment: Oscilloscope

Adjusting point: R158

1. Connect the plug into the line input terminal and set the mode to the REC (SP) under the no signal condition.
2. Connect the oscilloscope to TP202.
3. Adjust R158 so that FM amplitude level shows $0.35 \pm 0.02V_{p-p}$.



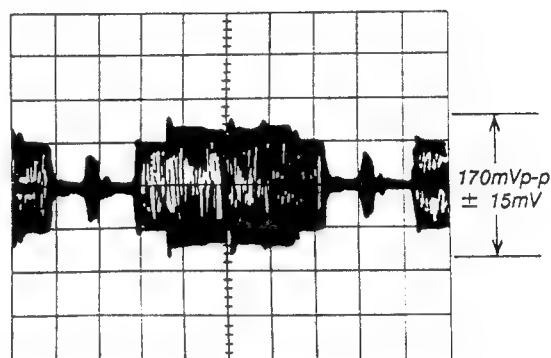
2-3-5. REC Color Level

Test point: TP204, TP208

Test equipment: Oscilloscope

Adjusting point: R451

1. Feed the PAL color bar signal to the line input terminals and set the VTR to the REC (SP) mode.
2. Connect the oscilloscope to TP208 and trigger the scope with HD pulse at TP204.
Adjust the scope so that a waveform is displayed for approx. 2H period.
3. Adjust R451 so that amplitude of the red portion shows $0.17 \pm 0.02V_{p-p}$.



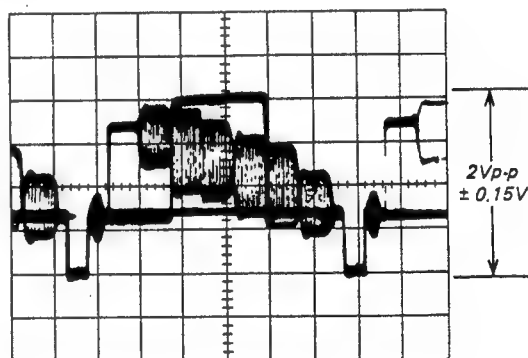
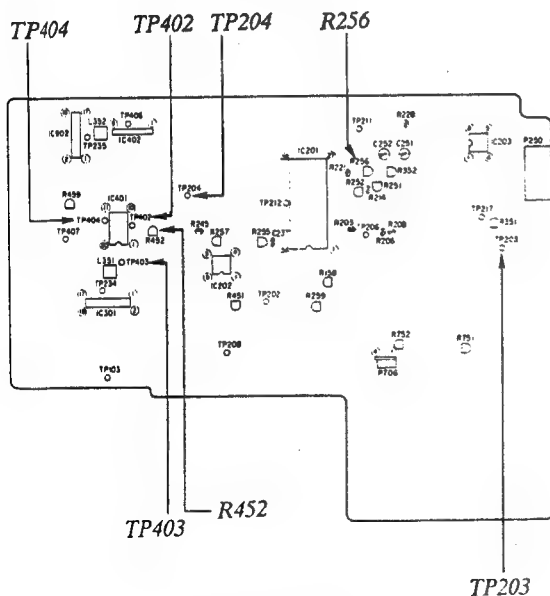
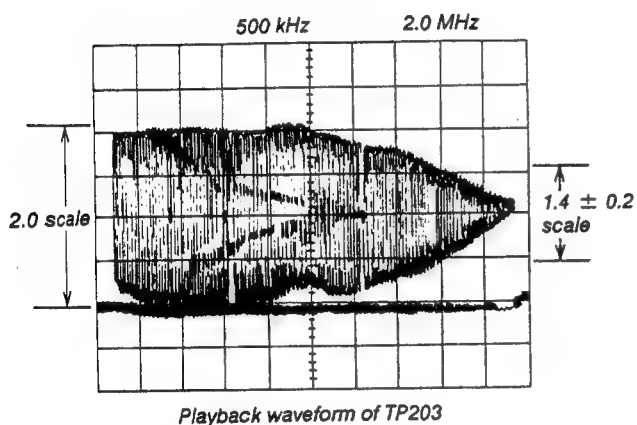
2-3-6. Picture Sharpness Preset

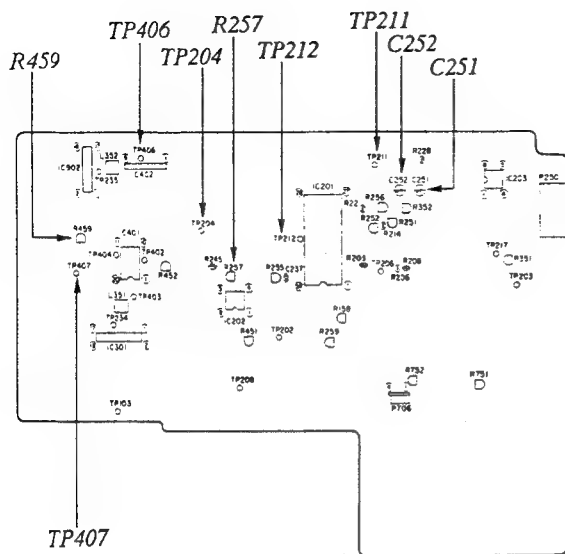
Test point: TP103, TP203

Test equipment: Oscilloscope

Adjusting point: R259

1. Place the sharpness control in its center click position.
2. Record and play back a video sweep signal fed to the line input terminals.
3. Connect the oscilloscope to TP203 and trigger the scope with a signal at TP103.
Adjust the scope so that a waveform is displayed for more than 1V (vertical sync) period.
4. Adjust R259 so that relative amplitude at 2 MHz shows 1.4 ± 0.2 (scale), where amplitude at 500 KHz is assumed as "A" (A = 2 scale).
5. Confirm that 2 MHz level increases when the sharpness control is turned clockwise and decreases when turned counterclockwise. Then replace the control at its center click position.



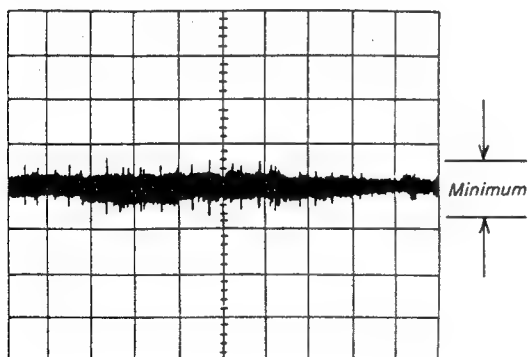


Main PC Board

2-3-9. Y Comb-filter Balance

Test point: TP204, TP212, TP213
Test equipment: Oscilloscope
Adjusting point: R257

1. Play back the test tape, ST-C1 (PAL color bar signal).
2. Unsolder the slit beside TP402.
3. Connect the oscilloscope (CH-1) to TP212 and trigger the scope with HD pulse at TP204.
4. Adjust R257 so that amplitude on the scope display shows minimum. (Ignore glitches.)
5. Solder the slit.



2-3-10. 4.43 MHz and 3.58 MHz XO Frequency

Test point: TP211
Test equipment: Frequency counter
Adjusting point: C251, C252

1. Play back the alignment tape, ST-C1 (NTSC color bar signal).
2. Connect a frequency counter to TP211 and set the measurement range to a position which gives reading accuracy of 1 Hz.
3. Place the Video System SW in the AUTO, and 3.58 position.
4. Adjust C252 trimmer until the frequency reading of 4.433619 MHz \pm 50 Hz is obtained.
5. Place the Video System SW in the AUTO and 4.43 position.
6. Adjust C251 trimmer until the frequency reading of 3.579545 MHz \pm 50 Hz is obtained.

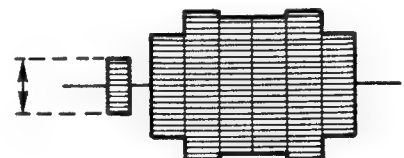
2-3-11. LP STILL Color Level

Test point: TP204, TP406, TP407
Test equipment: Oscilloscope
Adjusting point: R459

1. Play back the test tape ST-C1 (PAL color bar).
2. Set the video system switch to PAL mode.
3. Connect the oscilloscope to TP406 and TP407 and set the scope to the two-channel display mode. Trigger the scope with the HD pulse at TP204 and display the waveform for approx. 2H period.
4. Adjust R459 so that the burst level at TP407 becomes 1.6 – 2.5 scales with the burst level at TP406 set to 2 scales.

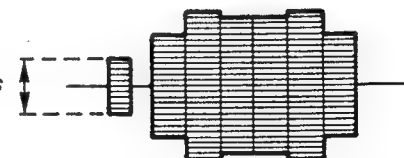
TP406
(Reference)

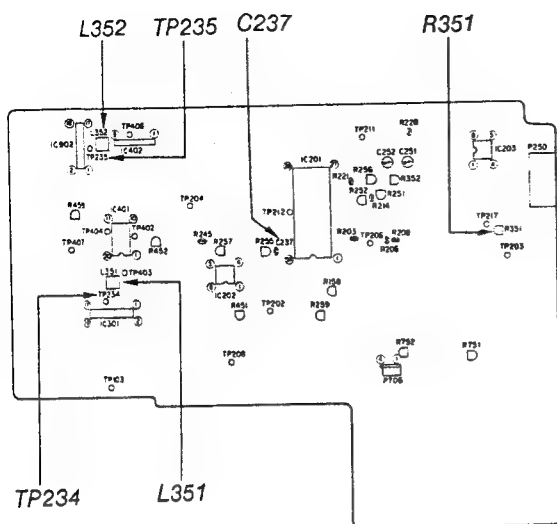
2 scales



TP407

1.6 – 2.5 scales





Main PC Board

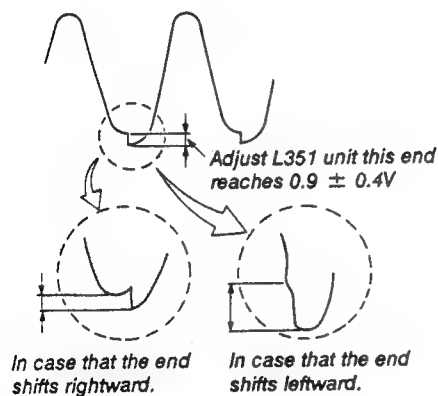
2-3-12. MESECAM Detection Level

Test point: TP234

Test equipment: Oscilloscope

Adjusting point: L351

1. Feed the SECAM color bar signal to the line input terminal and set the VTR to REC mode.
2. Connect the oscilloscope to TP234.
3. Adjust L351 until the detector output waveform ends reaches $0.9 \pm 0.4V$.



2-3-13. SECAM Detection Level

Test point: TP235

Test equipment: Oscilloscope

Adjusting point: L352

1. Play back the SECAM alignment tape (color bar signal) ST-C1.
2. Connect the oscilloscope to TP235.
3. Adjust L352 until the detector output waveform ends reaches $0.9 \pm 0.4V$.

2-3-14. NTSC Skew Correction Delay Output Level

Test point: Line output terminal

Test equipment: Monitor TV

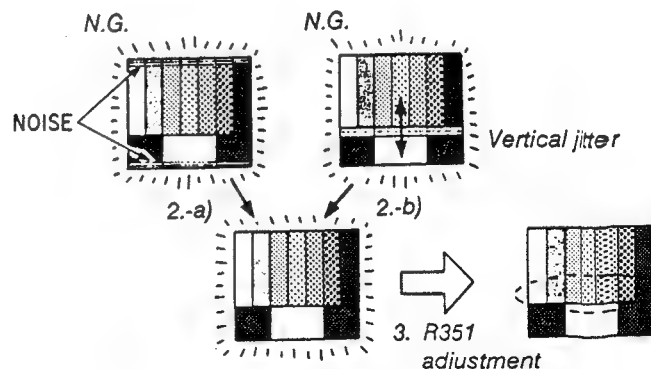
Adjusting point: R351

1. Connect the line output terminal to the monitor TV, and feed the NTSC color bar signal. Play back the alignment tape (ST-C1). And set the VTR to the still mode.
2. In this case, make sure the following points:
 - a) Slow tracking has not been adjusted so that less noise appear on the screen, especially on the top side of the screen.
 - b) V-Lock adjustment has not been made so that boundary between the steer signal and the 100% white does not show vertical jitter on the screen.
3. Adjust R351 to minimize the flicker on the screen (especially at the boundary between the steer signal and 100% white.).

Note:

In this case, it is recommended to remove color on the monitor TV by color density adjusting VR, or by short circuiting both ends of C237.

When the power block is exchanged or the power voltage is suspected to be changed, it is necessary to perform this adjustment.





SECTION 3

SERVICING DIAGRAMS

1. Inspection Procedure

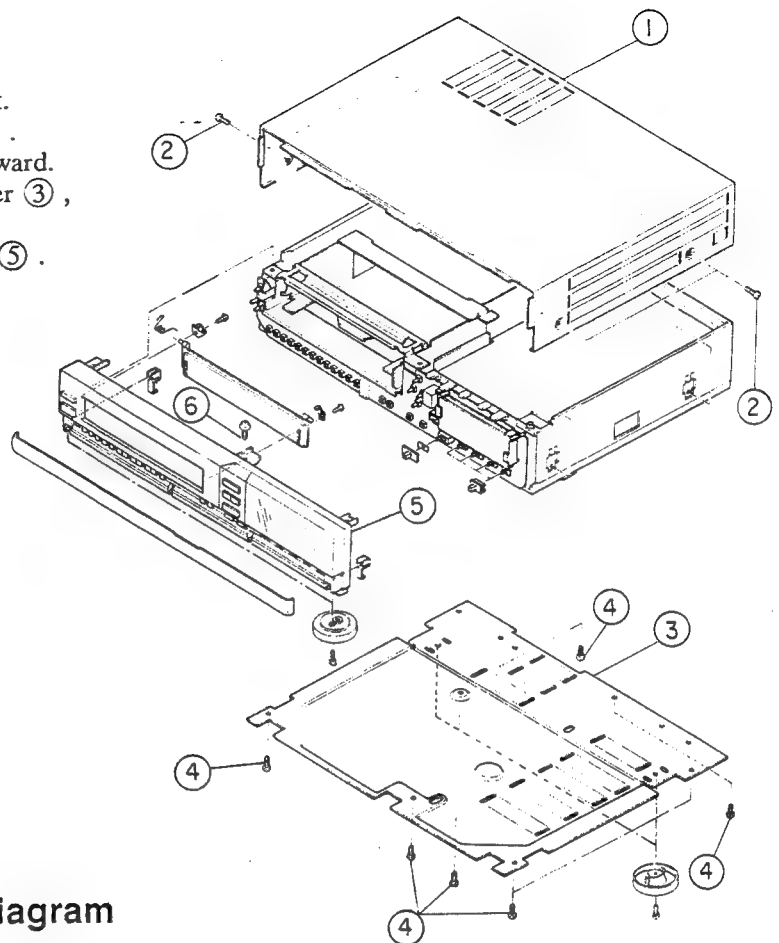
Operation steps		Items to be confirmed	Inspection block	Page	
				Block Diagram	Circuit Diagram
1. AC Plug-in	Time setting Program timer setting	Clock display Time setting operation	Power (AC system) Timer	3-11 3-15	3-32 3-36
2. Power SW ON	Timer/counter, Memory Channel selection, AFC operation, EE picture & tone quality	Mode display lamp TV receive condition, Channel select operation, AFC operation level, EE picture quality, Tone signal level	Power Logic RF reception Video (EE, Rec mode) Audio (EE, Rec mode)	3-11 3-20 3-12 3-27 3-31	3-32 3-39 3-33 3-47 3-49
3. Cassette-in and Cassette-out	Cassette-in Cassette loading Eject Cassette-out	F/L mecha. operation Cassette loading operation Eject operation Indicator lamp Abnormal sound	Logic	3-20	3-39
4. Key entry operation Remote control	REC, PLAY Cue/Review Still, Frame feeding/slow FF/REW	Indicator lamp Each mode operation (Tape drive operation) Abnormal sound	Logic Remote control	3-20	3-39 3-51
5. Special Functions Fully Automatic Play Auto Rewind	Cassette-in at Power OFF REC/PLAY/CUE	Power ON, Cassette down Automatic Play Power OFF after REW Rewind automatically after tape wound	Power Logic	3-11 3-20	3-32 3-39
6. Playback Function Picture Sharpness Tone Quality Others	PLAY (Test tape: ST-C1) Cue/Review Still/Slow	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-27 3-31 3-20	3-47 3-49 3-39
7. REC/PLAY Functions Picture Sharpness Tone Quality Others	REC/PLAY	Resolution, S/N Hue, Saturation, Color unevenness, Color dropout, Sound distortion, Level variation, Picture noise, Jitter Picture swing, Skew distortion, Flicker, Beat	Video PLAY system Audio PLAY system Servo system	3-27 3-31 3-20	3-47 3-49 3-39

How to use the table

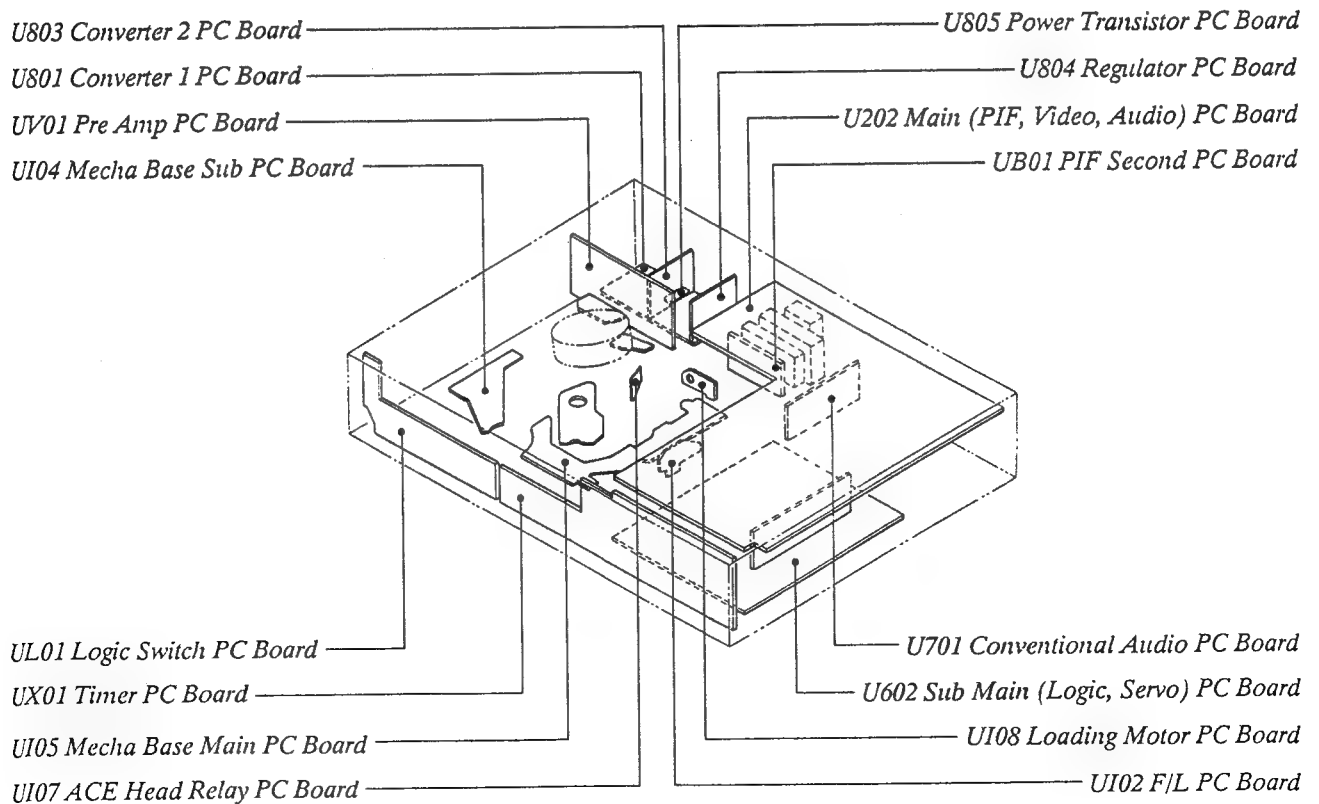
1. When inspecting a defective VTR, proceed according to the steps shown in the table.
2. Check the items to be confirmed for each operation step.
3. If a problem is found on the item, check waveforms (level) referring to the block diagram relating to the items.
4. Use PC board pattern diagram and schematic diagram to examine the circuit precisely.
5. After completion of the repair work, check steps 1 - 7 again.

2. Removal of Cabinet

1. Disconnect power cord plug from AC outlet.
2. Remove 4 screws ② securing top cover ①.
3. Remove the top cover ① by sliding it backward.
4. Remove 10 screws ④ securing bottom cover ③, then remove the bottom cover.
5. Remove the screw ⑥ securing front panel ⑤.
6. Remove the front panel ⑤.

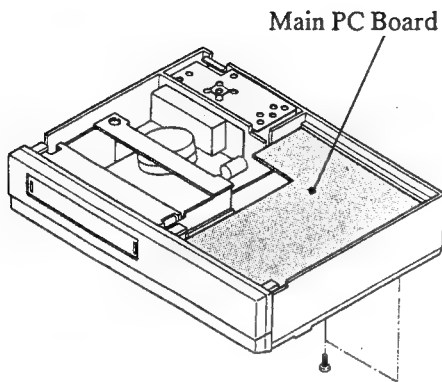


3. Electrical Units Location Diagram



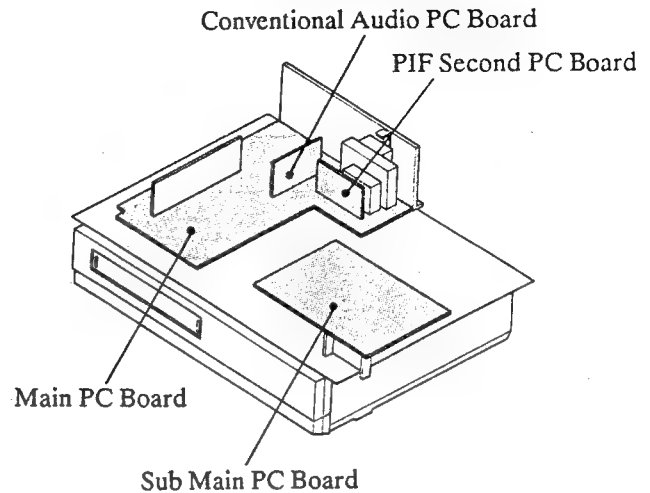
4. Standing PC Boards for Servicing

Main (PIF, Video, Audio) PC Board

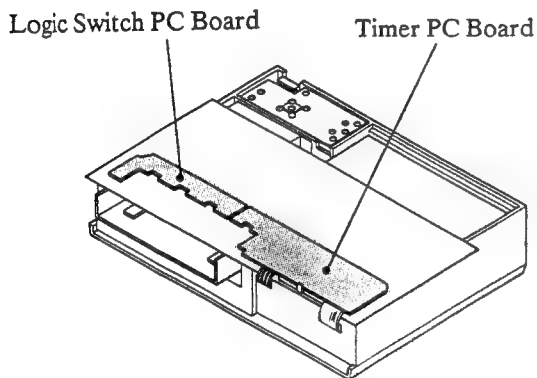


Note:
Before removing the main PC Board, remove 2 screws from the bottom plate.

Main (PIF, Video, Audio), Sub Main (Logic, Servo), PIF Second, Conventional Audio PC Board

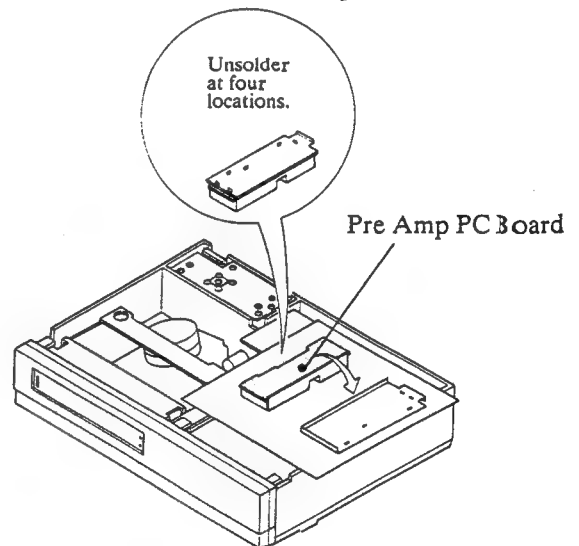


Timer, Logic Switch PC Board

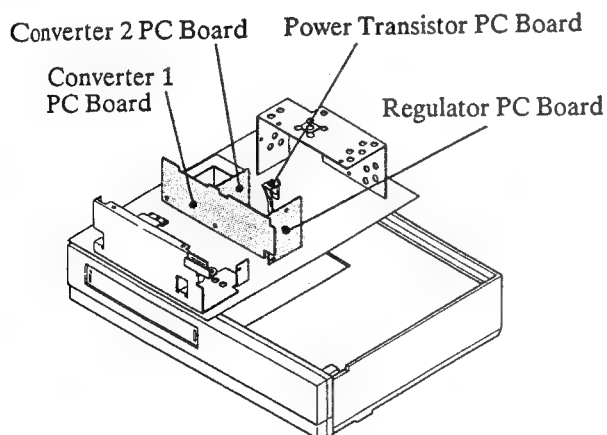


Pre Amp PC Board

Remove the shield plate.

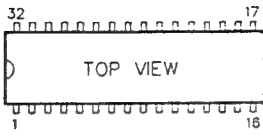
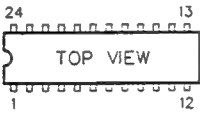

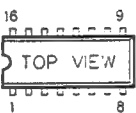
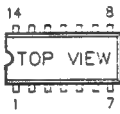
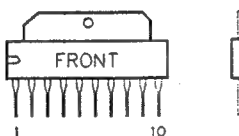
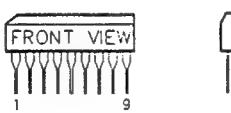
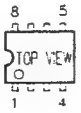






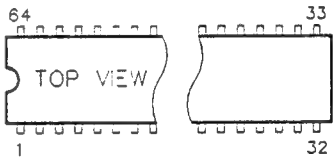
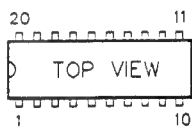
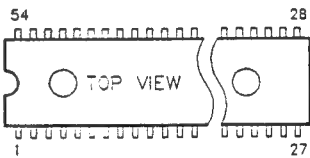
Regulator, Power Transistor, Converter 1, Converter 2 PC Board



5. Part Configuration and their Symbols

1. ICs

NAME	SHAPE
BA7765AS	
AN3385NK-A	
BA7025L	
TC4021	
NJM2902N BA10324 MC14013BCP	
TA7291P	
LVA523S NJM2234S TA75393P	
BR93C46	
BA10393	

NAME	SHAPE
TL8809P TL8811P	
TAB710S	
PST572D PST572C	
M50957-236SP TMP91C642N3025Z	
M52063SP	
TA8802N	

PRECAUTIONS FOR PART REPLACEMENT

- * In the schematic diagram, parts marked Δ (ex. Δ F801) are critical part to meet the safety regulations, so always use the parts bearing specified part codes (SN) when replacing them.
- * Using the parts other than those specified shall violate the regulations, and may cause troubles such as operation failures, fire, etc.

SOLID RESISTOR INDICATION

Resistor	1/6W film	P type film	U type film	Solid	Oxide film	Metal film	Cement	Fuse
Symbol	None	P	U	S	R	W	W	RF
Tolerance	±2%	±5%	±10%	±20%				
Symbol	G	J	None	None				

* All film type and oxide film resistors are ±5%, so the tolerance symbol was not indicated for them.

CAPACITANCE INDICATION

Description	Symbol	Capacitance, unit	Capacitance allowance
Electrolytic	⊕ —	μF	Not indicated
Special electrolytic			Indicated
Plastic film	— —	μF: indicated with numbers below decimal point	Indicated below ±5% (J), indicated below ±0.5pF, not indicated for others
Ceramic		pF: indicated with numbers over decimal point	
Trimmer	↗↘	pF	Not indicated

Note: No working voltage is indicated for capacitors rated at 50V except electrolytic capacitors.

WAVEFORM AND VOLTAGE MEASUREMENT

- * Measurement of waveform and voltage at each section in the color circuits was conducted with sufficient service color bar signal being received and reproduced in normal conditions.
- * Waveforms and voltage values for the remaining circuit were measured with a broadcasting signal normally received, so they may vary slightly according to the programs being received. Use them as a measure for servicing.
- * All voltage values except the waveforms are expressed in DC and measured by a digital voltmeter.

CHIP PART REPLACEMENT

(Use spare part with wire leads connected.)

1. Hold a Chip part to be removed with tweezers and apply heat to the solder at one end of the part with a soldering iron. (Fig. 1)
2. Apply heat to the solder at the other end of the part and remove it.
The heating time should be as short as possible so the excessive heat is not applied to foil patterns and the PC Board.
3. If it is difficult to remove the part, temporarily stop the desoldering job and wait until temperature of the part lowers. Then, repeat steps 1 and 2.
4. Form leads of the replacement part (general part equivalent to the chip part) as shown in the figures and solder place. (Fig. 2)
5. Mount the replacement part so that it does not touch any other parts. (Fig. 3)

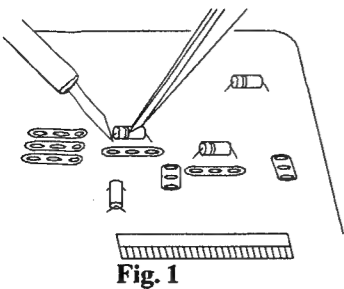


Fig. 1

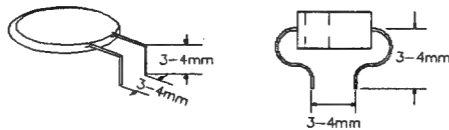


Fig. 2

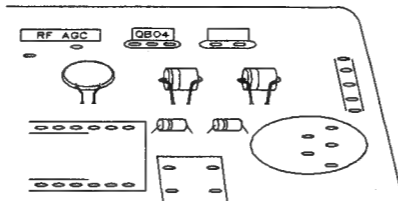


Fig. 3

REPLACING SUBMINIATURE "CHIP" PARTS

- 1) Required tools:
 1. Fine tipped, well insulated soldering "pencil", about 30 Watts.
 2. Tweezers
 3. Blower type hair dryer.
- 2) Soldering cautions:
 1. Do not apply heat for more than 3 seconds.
 2. Avoid using a rubbing stroke when soldering.
 3. Discard removed chips; do no reuse them.
 4. Supplementary cementing is not required.
 5. Use care not to scratch or otherwise damage the chips.

- 3) Removal (resistors, capacitors, etc.):
 1. Melt the solder at one side.

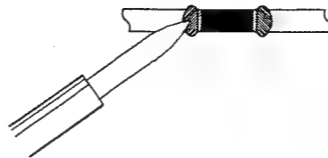


Fig. 1

2. Grasp the part with tweezers and melt the solder at the other side.

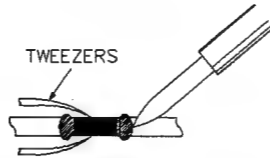


Fig. 2

3. Remove the part with a twisting motion.

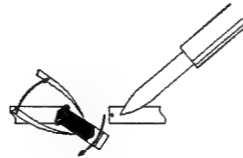


Fig. 3

- 4) Removal (transistors, diodes, etc.):
 1. Melt the solder of one lead.

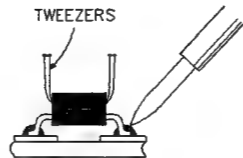


Fig. 4

2. Lift the side of that lead upward.

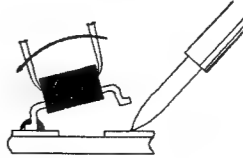


Fig. 5

3. Simultaneously heat solder the two remaining leads and lift part to remove.

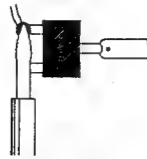


Fig. 6

- 5) Preheating (except for semiconductors):
Immediately before installing new resistors or capacitors, use a blower type hair dryer and preheat the part for about two minutes at approximately 150°C.

- 6) Replacement:
 1. Presolder the contact points of the circuit pattern.

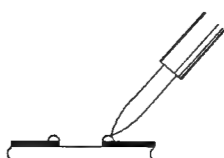


Fig. 7

2. Press the part downward with tweezers and apply the soldering pencil as indicated in the figure.

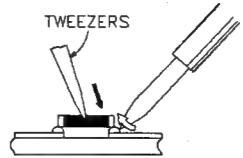
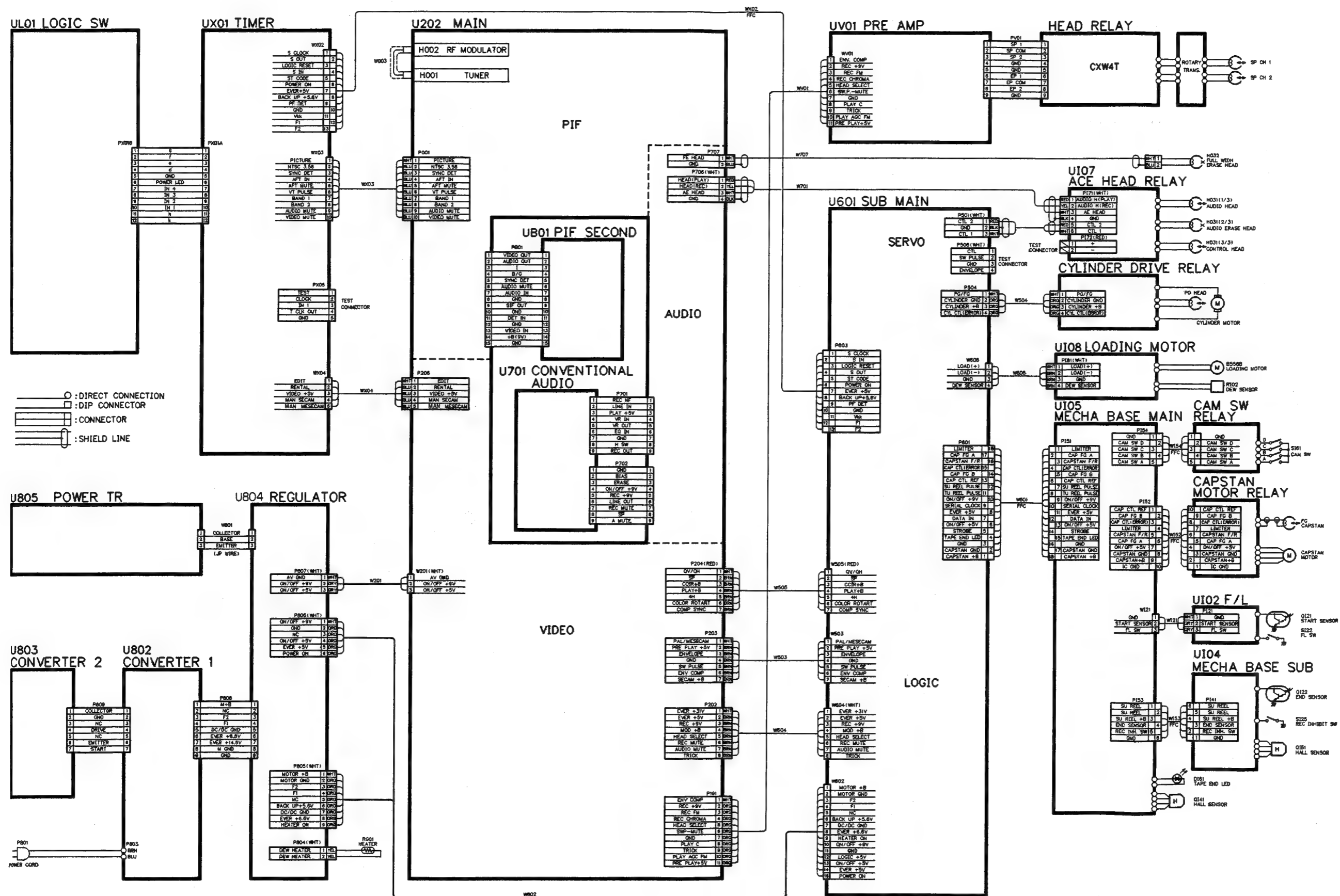


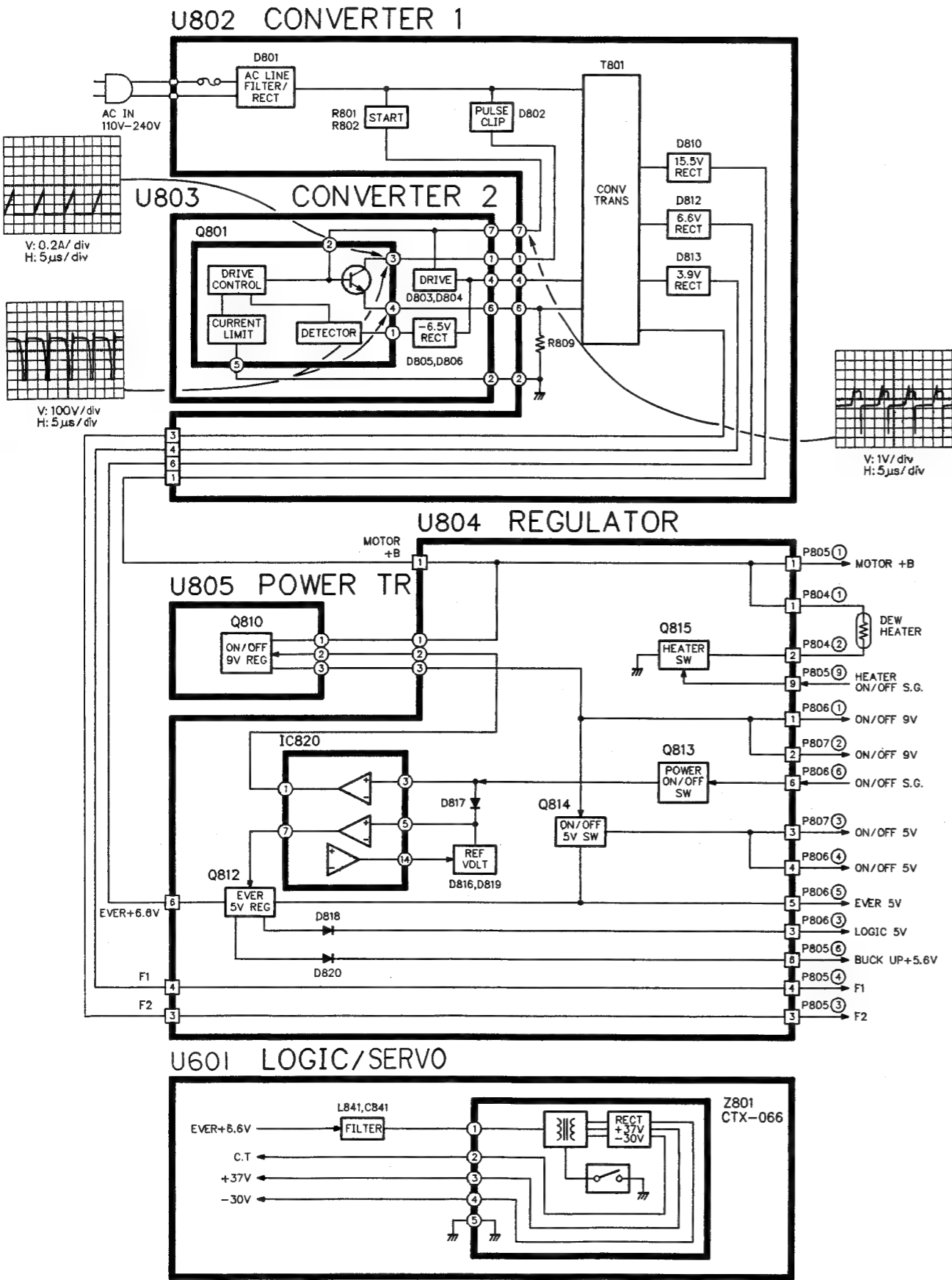
Fig. 8

6. Printed Wiring Board and Schematic Diagram

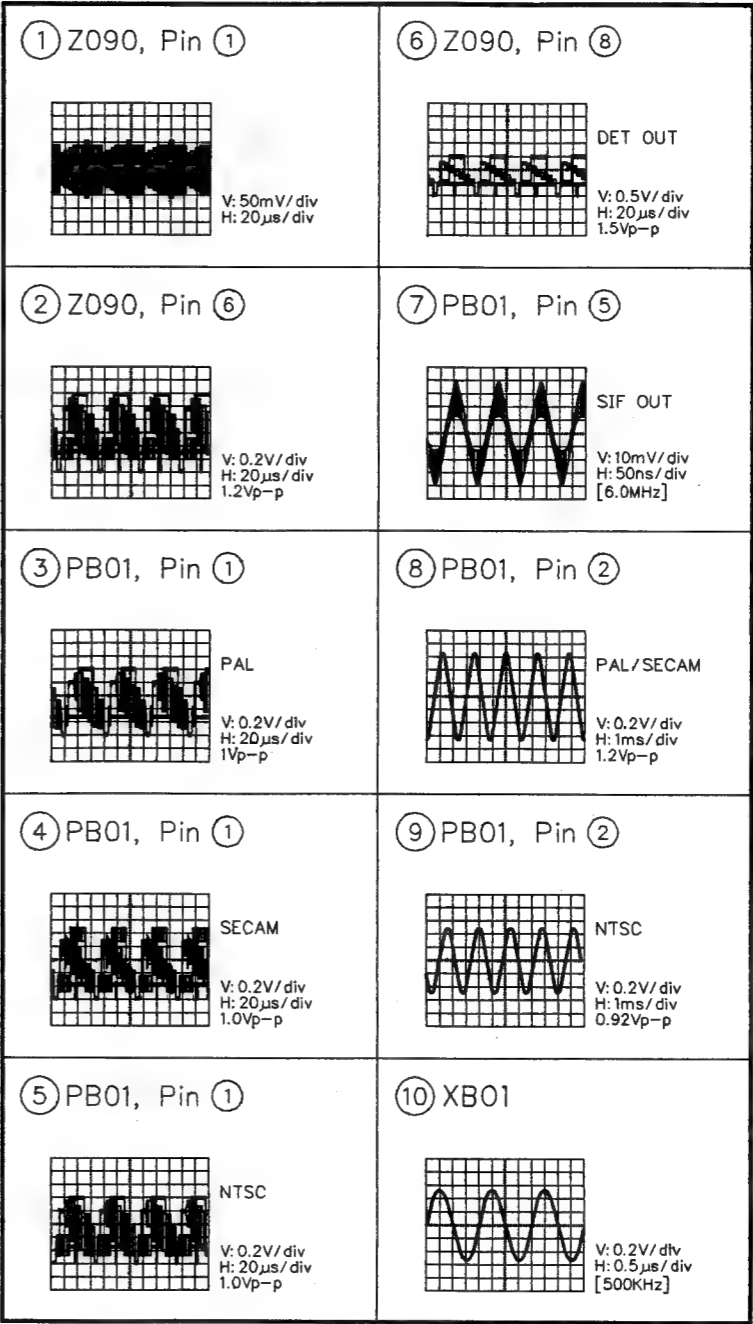


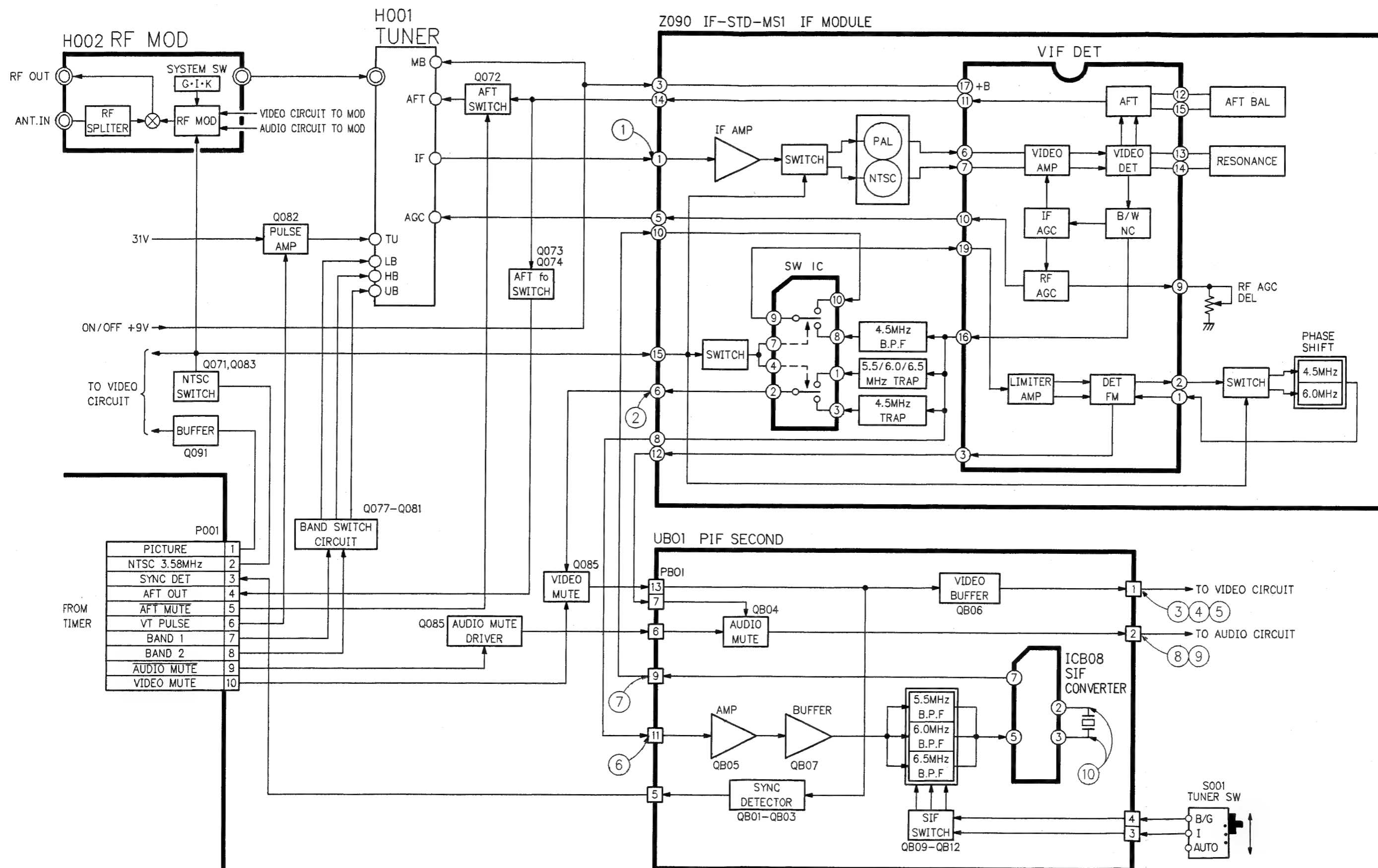
7. Block Diagrams

7-1. Power Supply Block Diagram

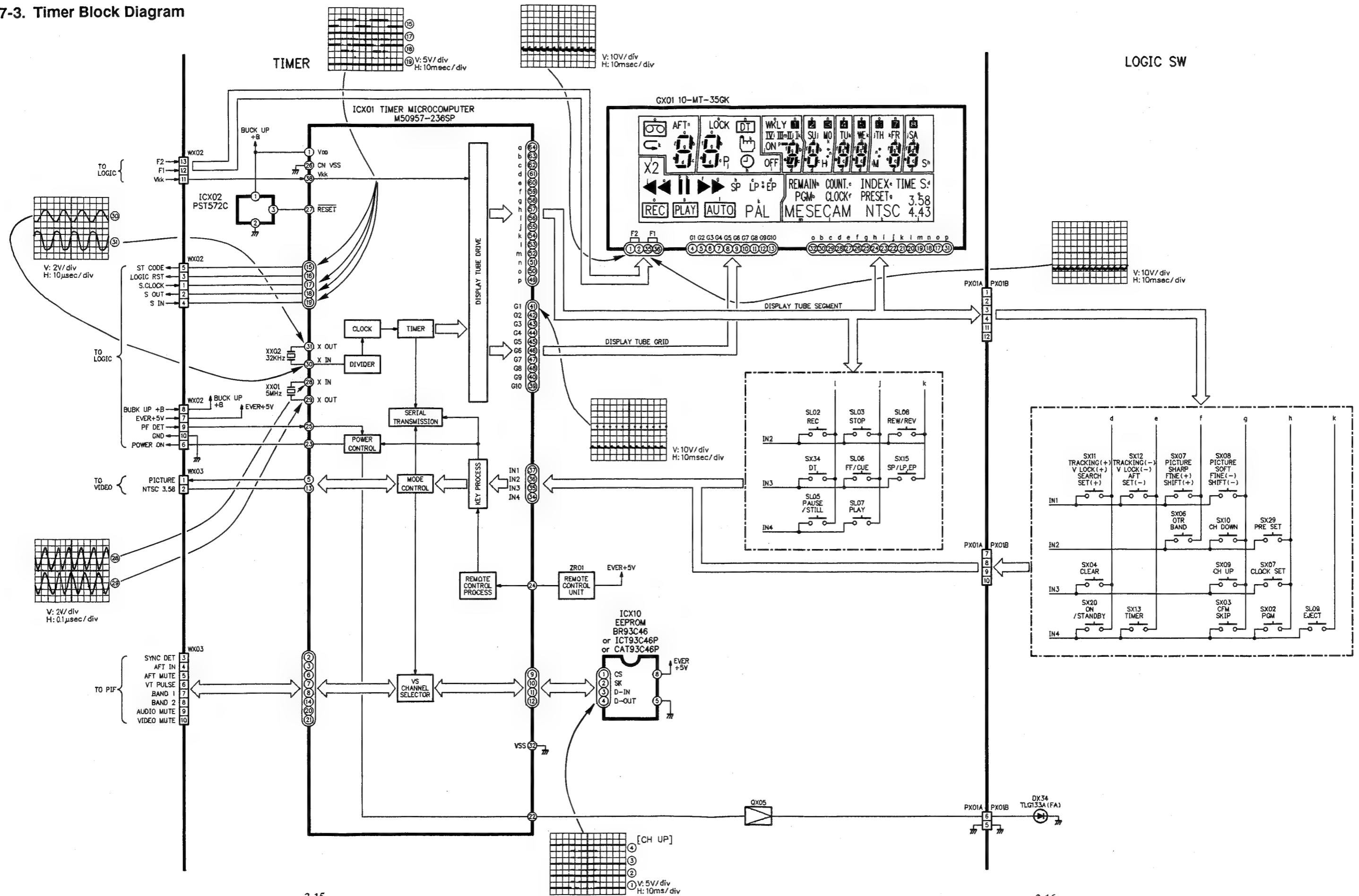


7-2. PIF Block Diagram

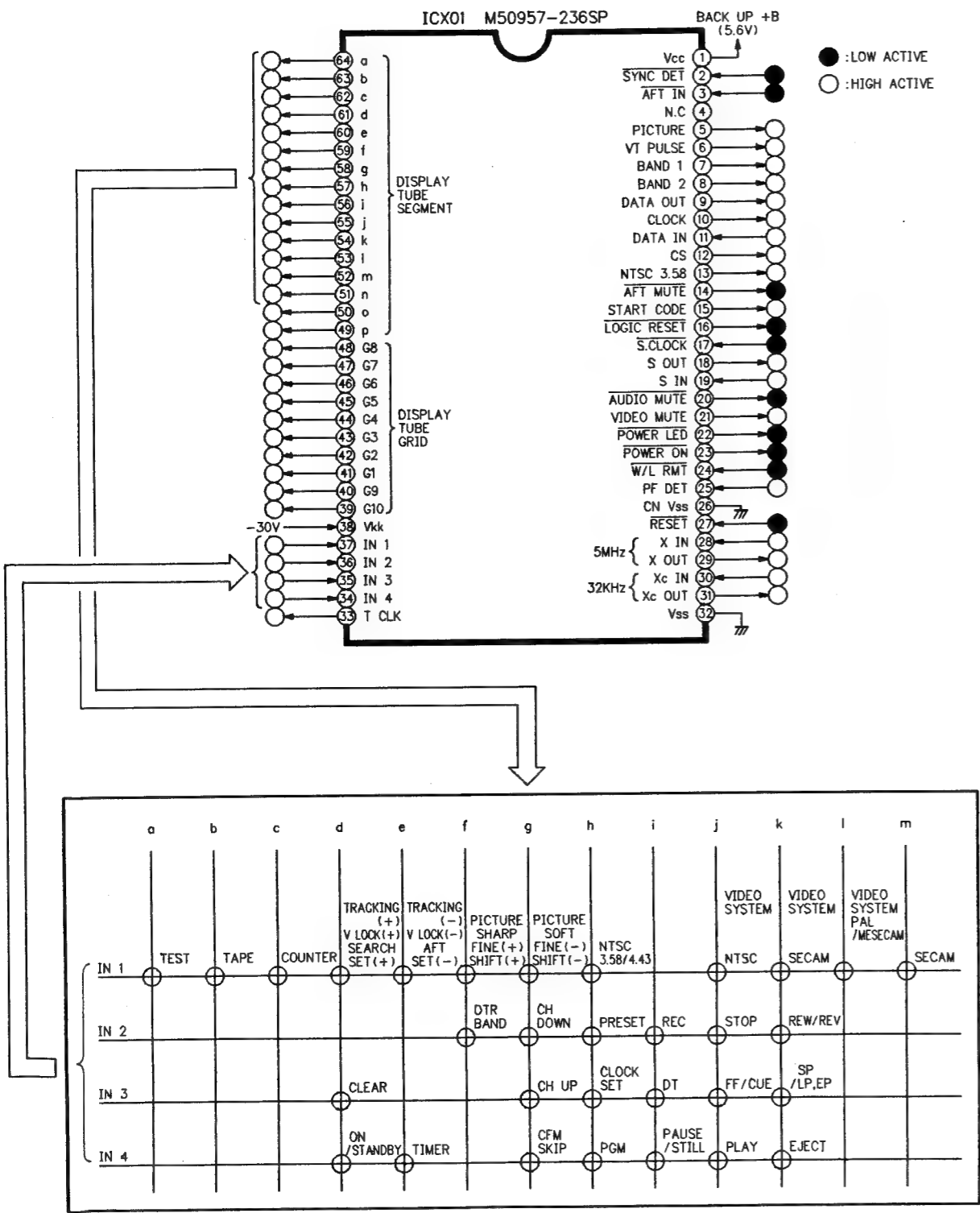




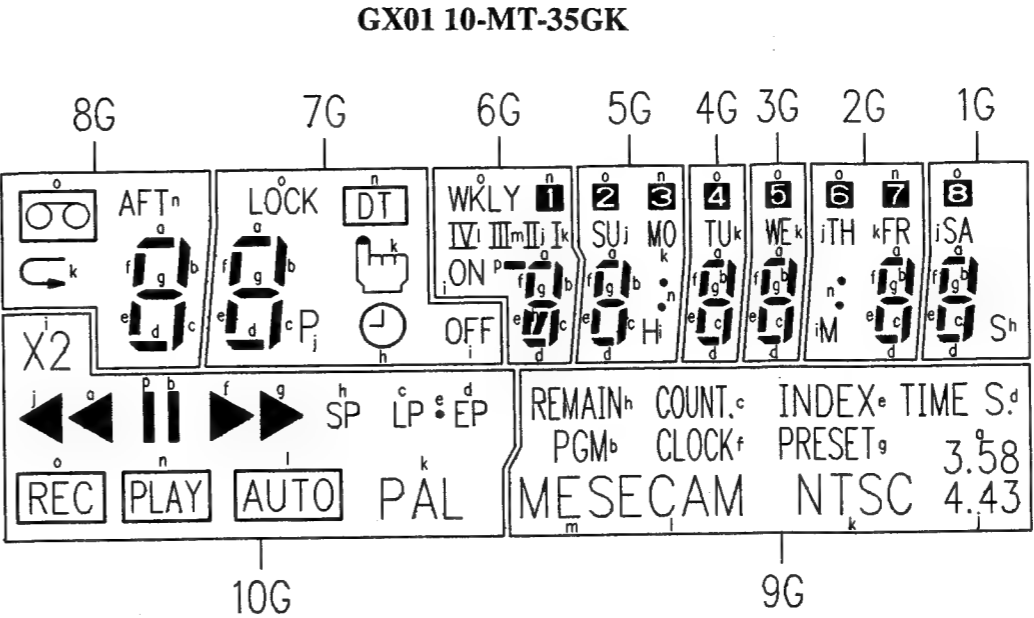
7-3. Timer Block Diagram



Timer Microcomputer Terminal Function

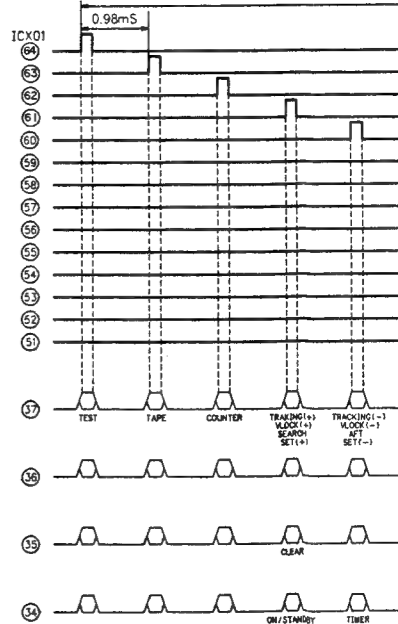
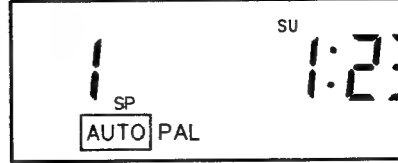
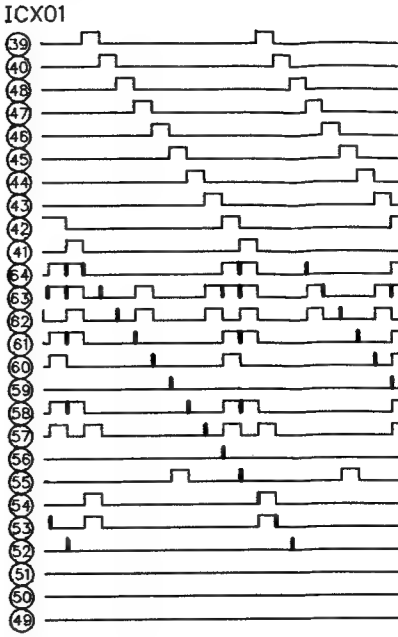


Timer Display

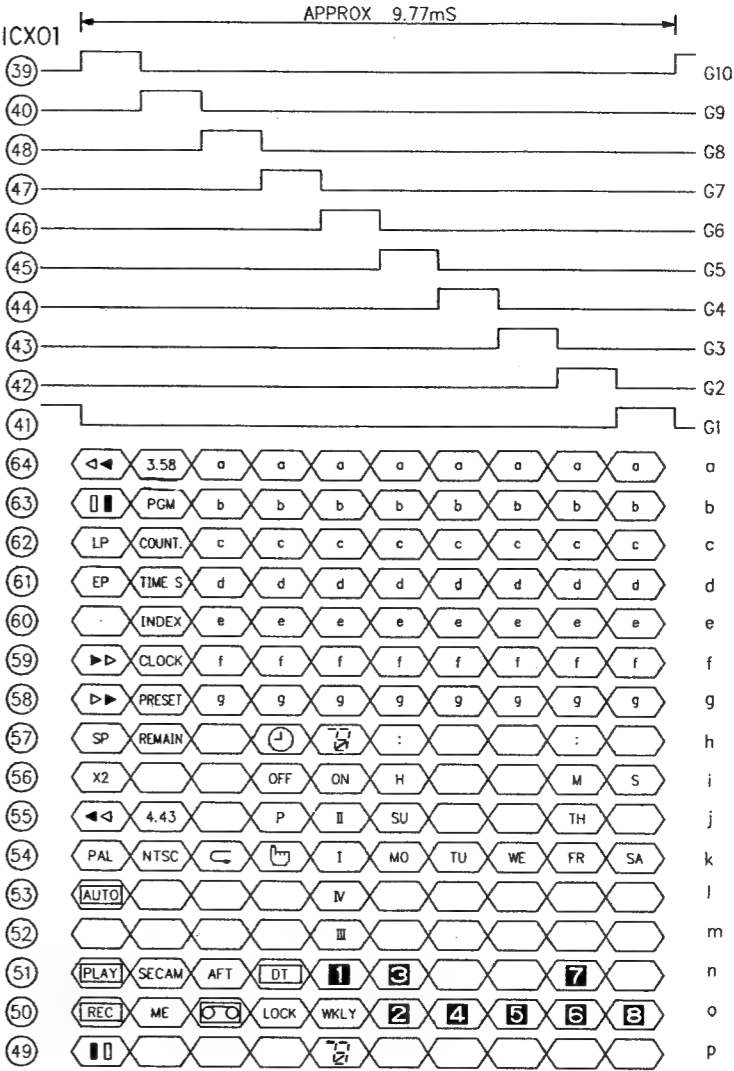
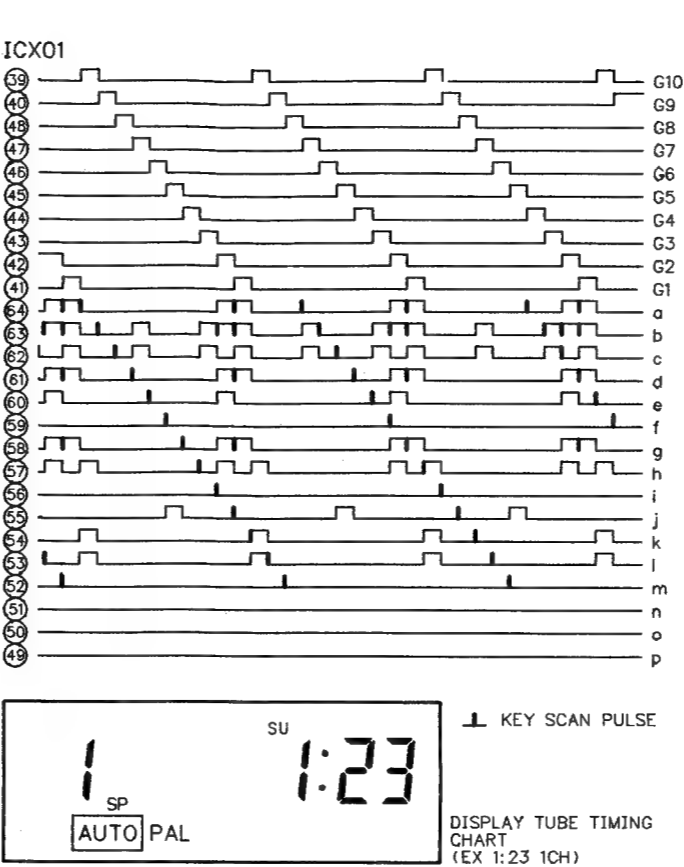
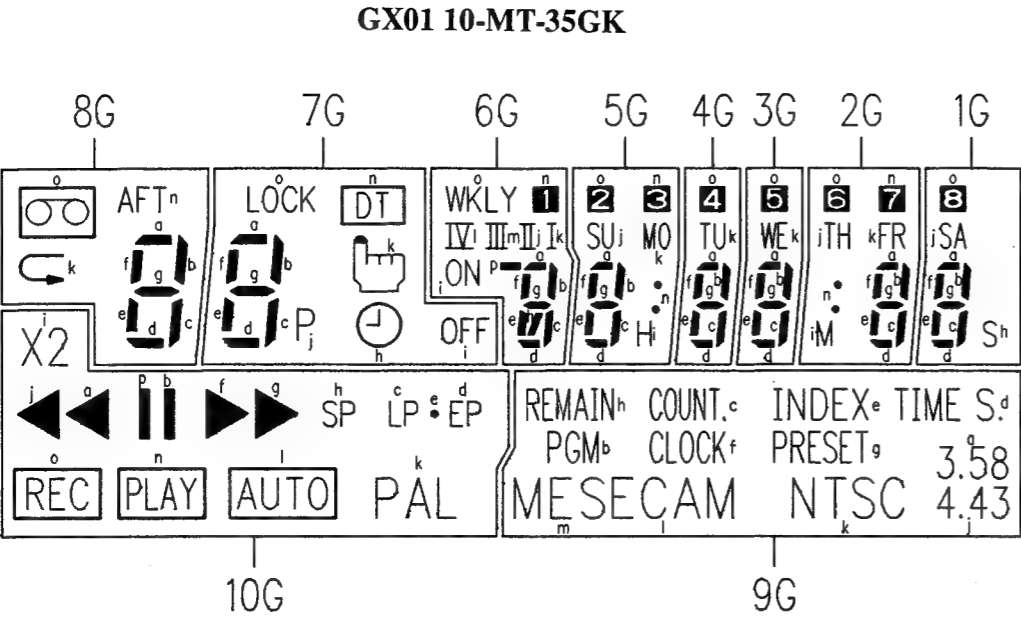


Timer Display Pattern

	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	◀◀	3.58	a	a	a	a	a	a	a	a
b	▮▮	PGM	b	b	b	b	b	b	b	b
c	LP	COUNT.	c	c	c	c	c	c	c	c
d	EP	TIME S.	d	d	d	d	d	d	d	d
e	.	INDEX	e	e	e	e	e	e	e	e
f	▶▶	CLOCK	f	f	f	f	f	f	f	f
g	▶▶	PRESET	g	g	g	g	g	g	g	g
h	SP	REMAIN	h	h	h	h	h	h	h	h
i	X2	/	i	i	i	i	i	i	i	i
j	◀◀	4.43	j	j	j	j	j	j	j	j
k	PAL	NTSC	k	k	k	k	k	k	k	k
l	AUTO	/	l	l	l	l	l	l	l	l
m	/	/	m	m	m	m	m	m	m	m
n	PLAY	SECAM	n	n	n	n	n	n	n	n
o	REC	ME	o	o	o	o	o	o	o	o
p	▮▮	/	p	p	p	p	p	p	p	p

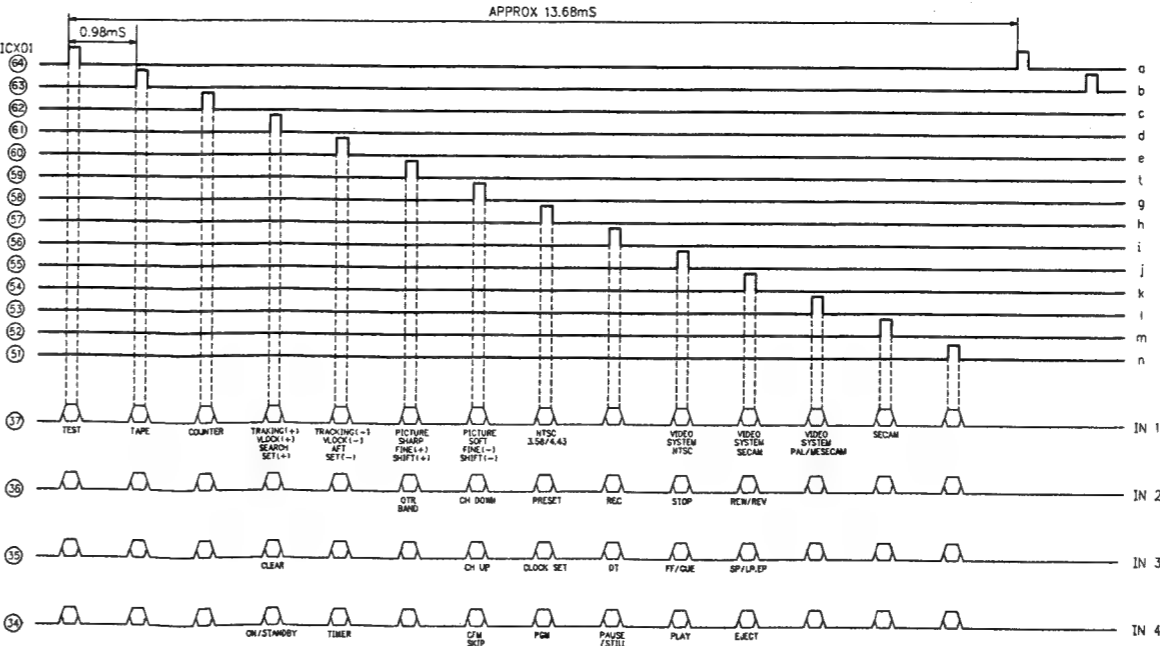


Timer Display

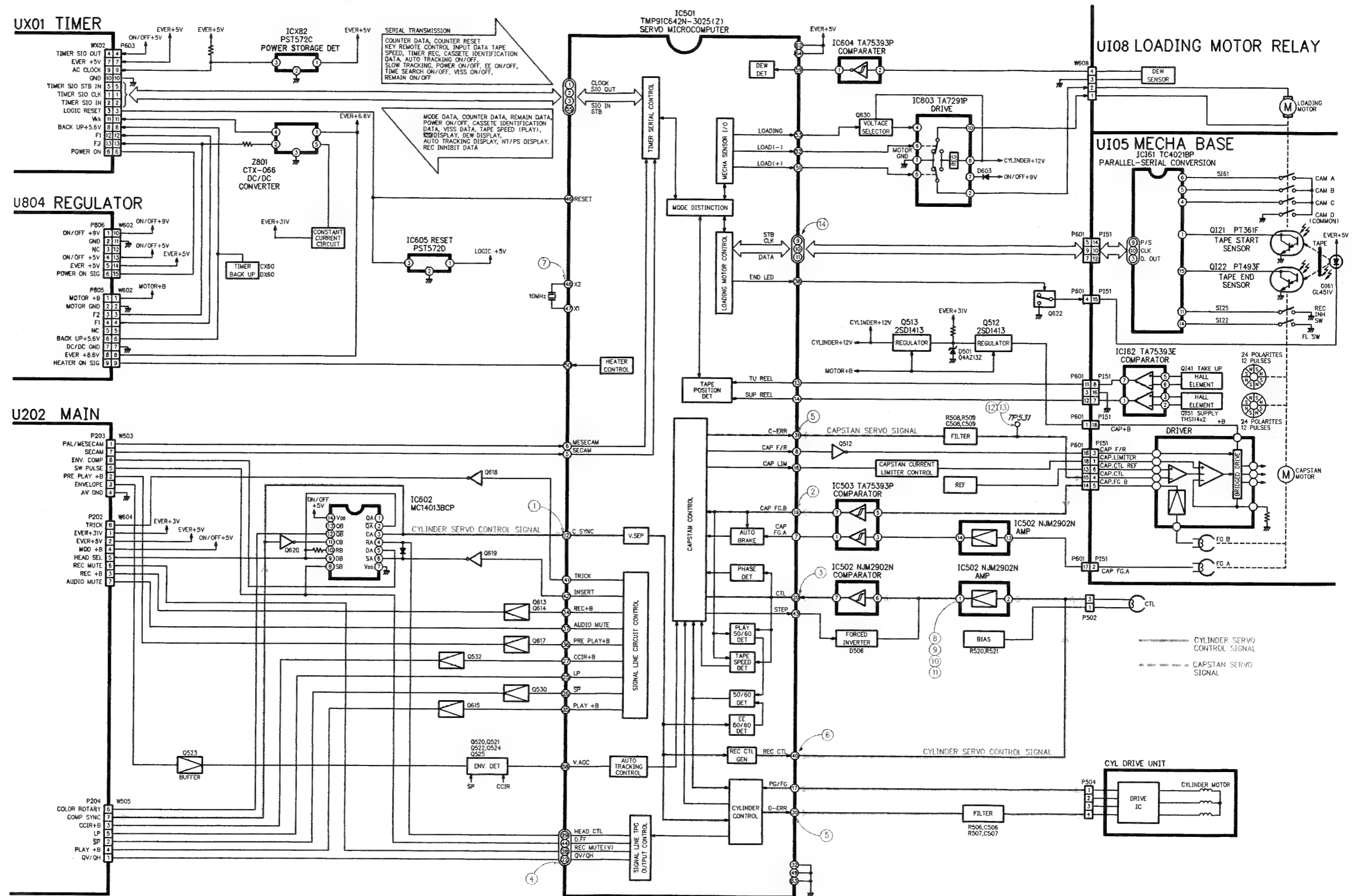


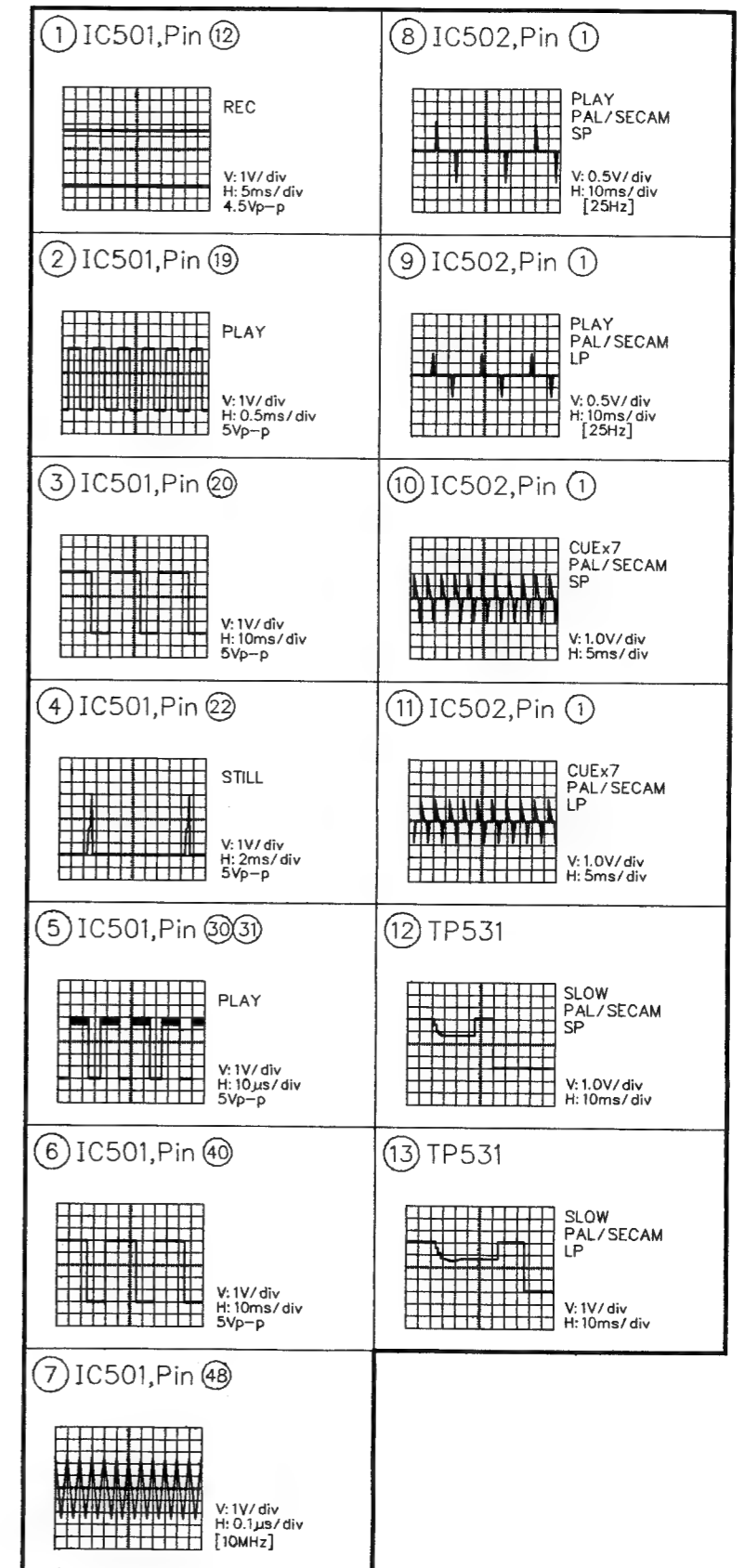
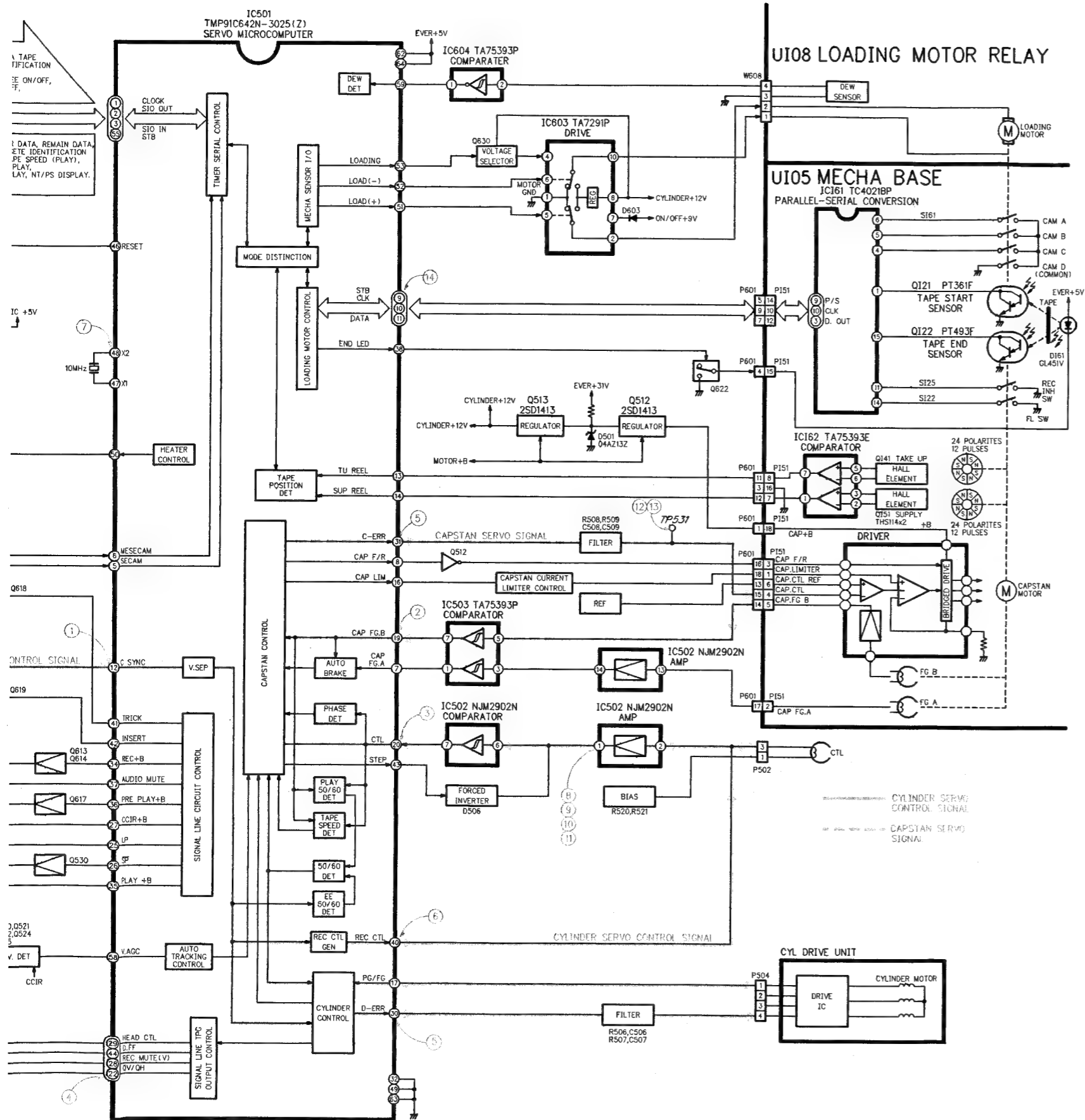
Timer Display Pattern

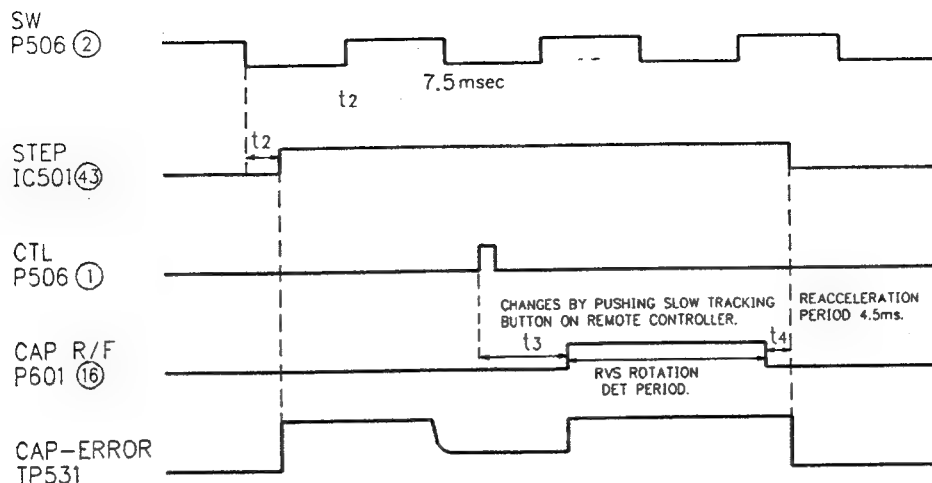
	10G	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	◀◀	3.58	a	a	a	a	a	a	a	a
b	▬▬	PGM	b	b	b	b	b	b	b	b
c	LP	COUNT.	c	c	c	c	c	c	c	c
d	EP	TIME S.	d	d	d	d	d	d	d	d
e	.	INDEX	e	e	e	e	e	e	e	e
f	▶▶	CLOCK	f	f	f	f	f	f	f	f
g	▶▶	PRESET	g	g	g	g	g	g	g	g
h	SP	REMAIN								
i	X2			OFF	ON	H			M	S
j	◀◀	4.43		P	II	SU			TH	
k	PAL	NTSC	↶	↷	I	MO	TU	WE	FR	SA
l	AUTO				IV					
m					III					
n	PLAY	SECAM	AFT	DT	1	3			7	
o	REC	ME	⏮	LOCK	WKLY	2	4	5	6	8
p	▬▬									



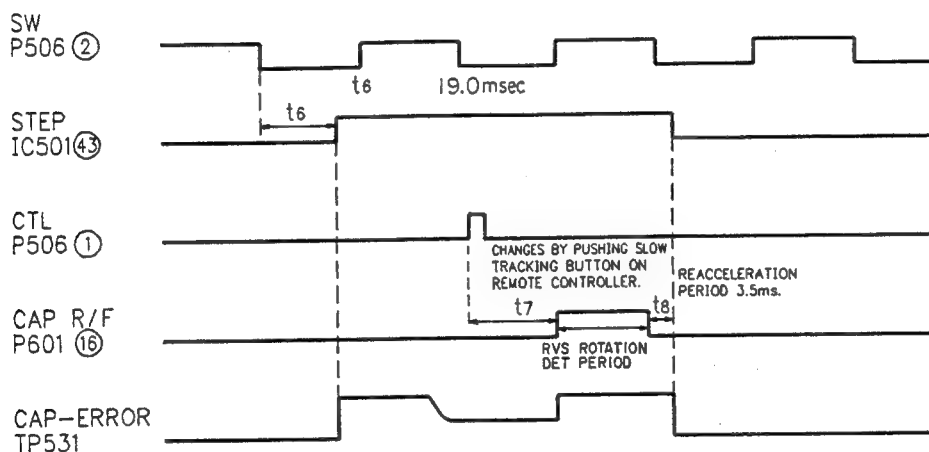
7-4. Logic/Servo Block Diagram



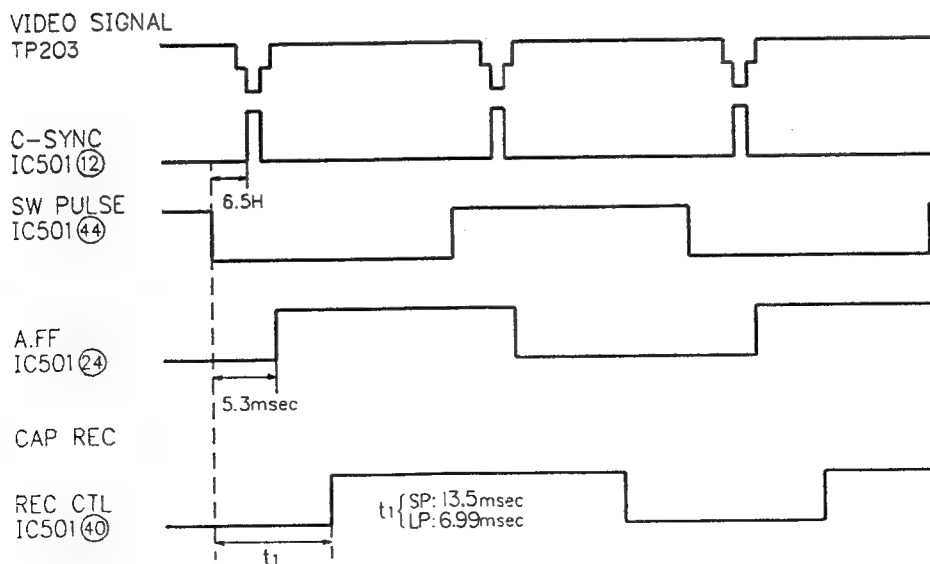




Slow Timing Chart (CCIR SP)



Slow Timing Chart (CCIR LP)



Servo Timing Chart (CCIR)

Logic Mode Shift Table

SW INPUT CURRENT MODE	EJECT	STOP	FF	REW	PLAY	×2	PAUSE /STILL	SLOW 1/6	SLOW 1/12	REC		TIMER REC	TAPE RETURN	TIME SEARCH		POWER
SLOT IN	○	○	△	△	△	△	×	×	×	×		×	—	—		POWER OFF
SLOT OUT	—	×	×	×	×	×	×	×	×	×		×	×	×		POWER OFF
STOP /STANDBY	○	—	○	○	○	○	×	×	×	○		○	○	○		POWER OFF
FF	○	○	CUE *	○	○	○	×	×	×	×		○	×	×		POWER OFF
REW	○	○	○	REVIEW *	○	○	×	×	×	×		○	×	×		POWER OFF
CUE	○	○	○	REVIEW *	○	○	×	×	×	×		○	×	×		POWER OFF
REVIEW	○	○	CUE *	○	○	○	×	×	×	×		○	×	×		POWER OFF
PLAY	○	○	CUE *	REVIEW *	—	○	STILL	○	○	×		○	×	○		POWER OFF
STILL	○	○	CUE *	REVIEW *	○ NOTE 1	○	PLAY	○	○	REC PAUSE		○	×	×		POWER OFF
SLOW 1/6	○	○	CUE *	REVIEW *	○	○	STILL	—	○	×		○	×	×		POWER OFF
SLOW 1/12	○	○	CUE *	REVIEW *	○	○	STILL	○	—	×		○	×	×		POWER OFF
× 2	○	○	CUE *	REVIEW *	○	—	STILL	○	○	×		○	×	×		POWER OFF
REC	×	○	×	×	×	×	REC PAUSE	×	×	—		○	×	×		POWER OFF
REC PAUSE	×	○	×	×	×	×	REC	×	×	×		○	×	×		POWER OFF
TIMER REC	×	×	×	×	×	×	×	×	×	×		POWER OFF	×	×		POWER ON
POWER OFF	×	×	×	×	×	×	×	×	×	×		○	×	×		POWER ON

NOTE 1 : FLAME (1/25 SLOW MODE WHEN BUTTON IS KEPT PUSHING)

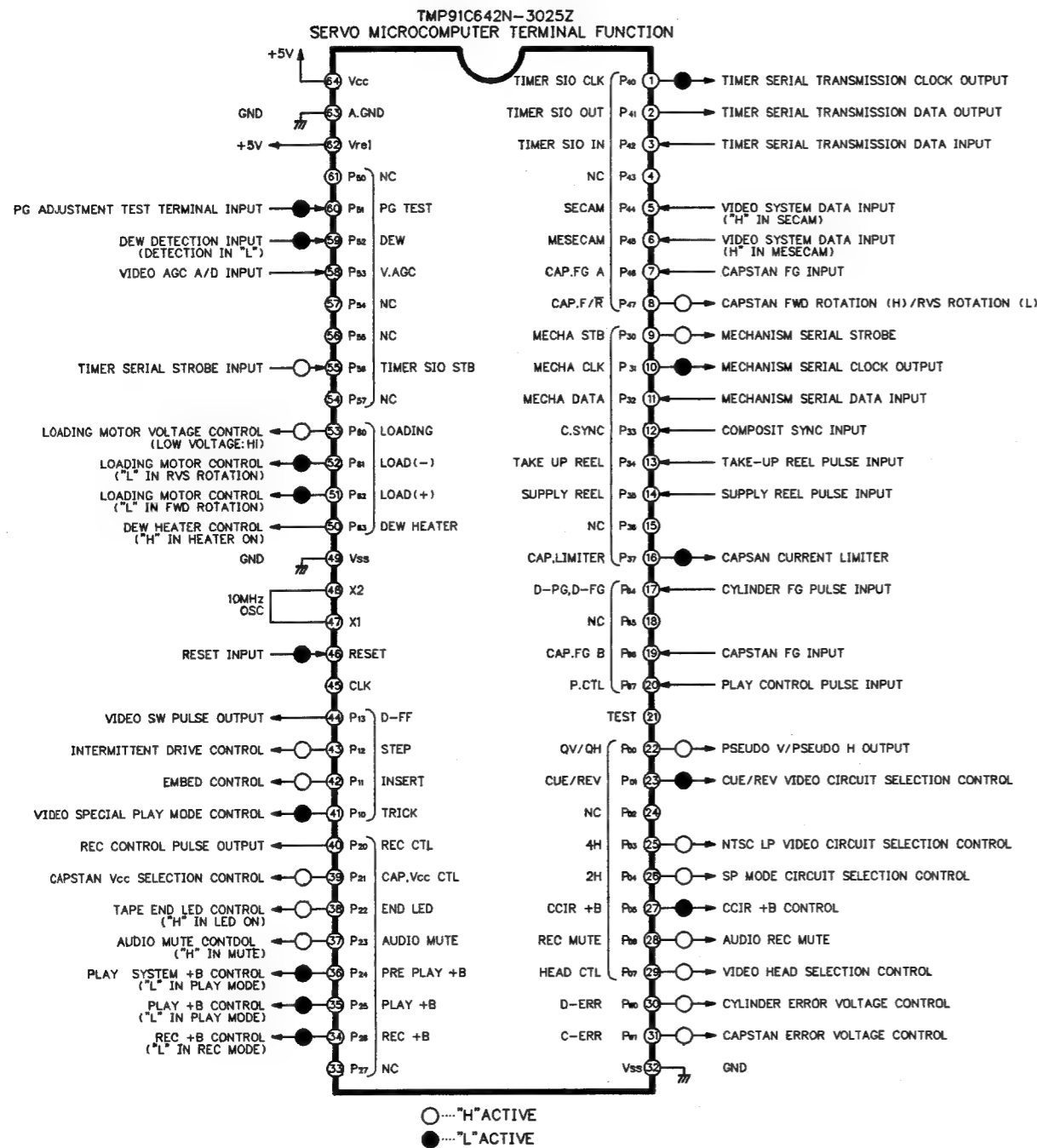
○ ... SHIFTS TO INPUT MODE DIRECTORY.

△ ... SHIFTS TO INPUT MODE AFTER SLOT IN IS COMPLETED.

×

* ... PAL : ×7 MODE,
NTSC : ×5 MODE

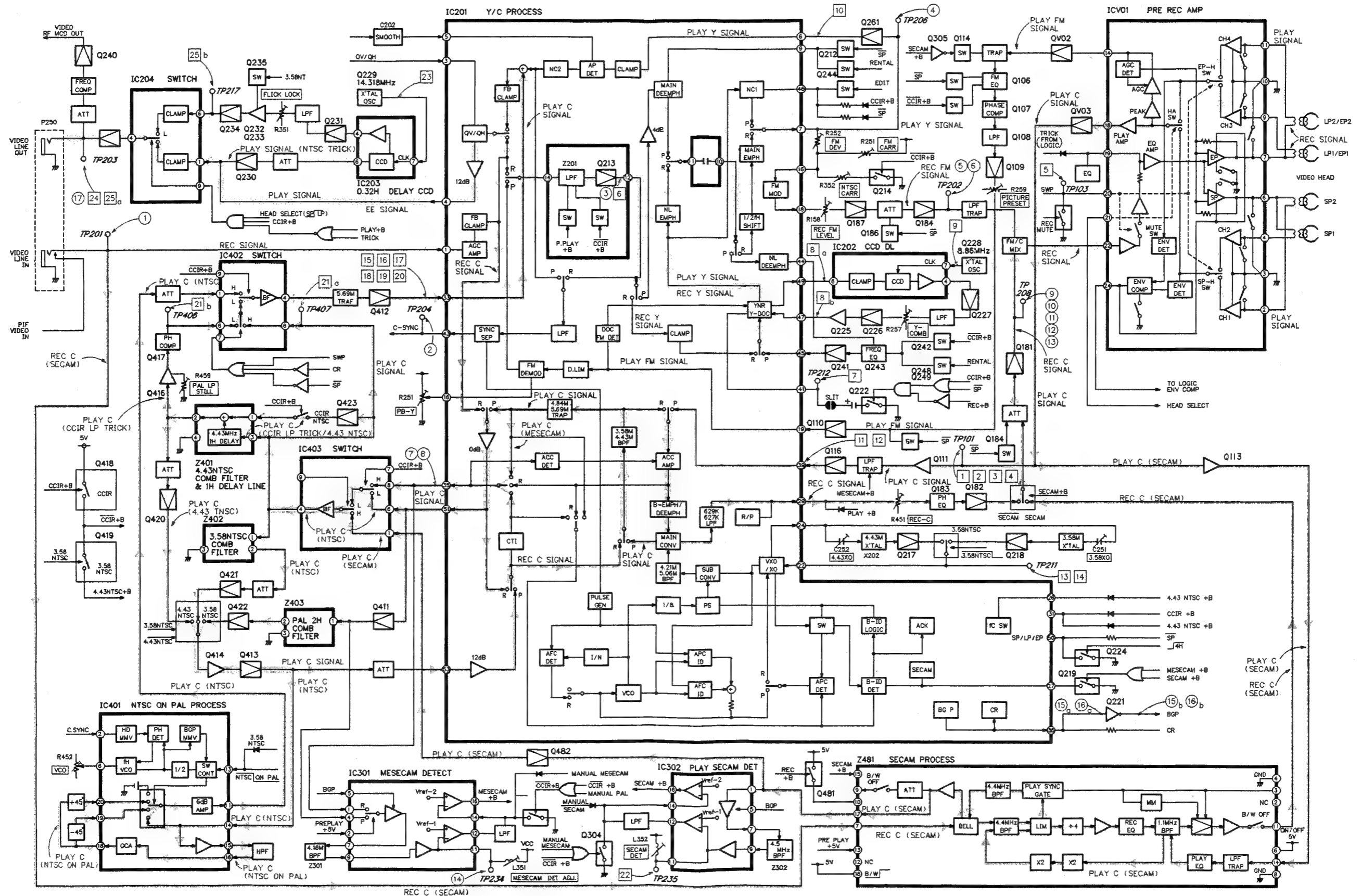
Logic/Servo Microcomputer Terminal Function



IC501 TMP91C642-3025 (Z) Output Polarity

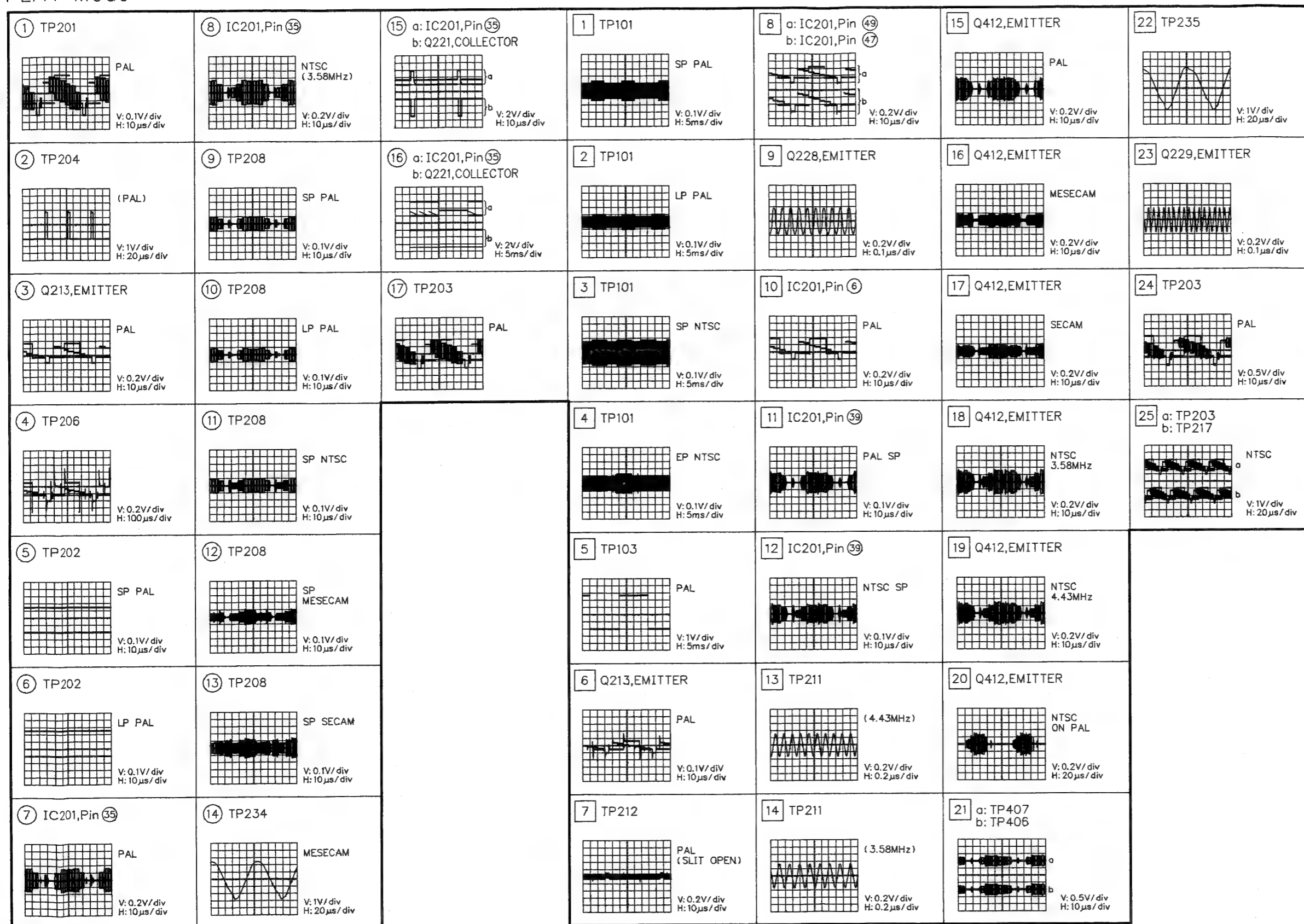
Pin No.	MODE	ACTIVE	SLOT IN	SLOT OUT	LOADING	UN-LOADING	STOP	STAND-BY	FF	REW	CUE	REW	PLAY	X2	STILL	SLOW	REC	REC PAUSE	NOTE
8	CAP.F/R	H	H	L	H	L	H	L	H	L	H	L	H	H	H	L	L		
16	CAP.LIM.	PWM	H	H	PWM	H	PWM	PWM	H	H	H	H	H	H	PWM	PWM	H	H	
22	QV/QH	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	
23	CUE/REV	L	H	H	H	H	H	H	H	H	L	L	H	H	H	H	H	H	
25	4H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	*1 "H" in NTSC/LP *2 Previous mode is kept.
26	2H	H	H	H	H	H	H	H	H	H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	*3 "H" in SP
27	CCIR +B	L	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	L/H	*4 "H" in NTSC *5 Previous mode is kept except for forced system.
28	REC MUTE	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
29	HEAD CTL	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	*6 "L" in SP *7 Phase of 180° difference from D-FF in SP.
30	CYLINDER-ERR	PWM	L	L	PWM	L	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	PWM	*8 "L" in DEW
31	CAP.-ERR	PWM	PWM	PWM	PWM	PWM	L	L	PWM	PWM	PWM	PWM	PWM	PWM	L	PWM	L		
34	REC +B	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	L	
35	PLAY +B	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	H	H	
36	PRE PLAY +B	L	H	H	H	H	H	H	H	H	L	L	L	L	L	L	H	H	
37	AUDIO MUTE	H	L	L	L	L	L	L	L	L	H	H	L	L	L	H	L	L	
38	T.END LED	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	
40	REC CTL	-	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	
41	TRICK	L	H	H	H	H	H	H	H	H	L	L	H	L	L	L	L	L	
42	INSERT	H	L	L	L	L	L	L	L	L	L/H	L/H	L	L/H	L/H	L	L	L	*9 "H" in SP *10 "H" only in SP starting
43	STEP	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	*11 "H" only in starting
44	D-FF	-	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	*12 "L" in DEW
50	DEW HEATER	H	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	
51	LOAD (+)	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	
52	LOAD (-)	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	
53	LOADING	H	H	H	H	L	L	L	H	H	H	H	L	L	L	L	L	L	
X	MECHA POSITION	X	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	*13 I pos in DEW

7-5. Video Block Diagram

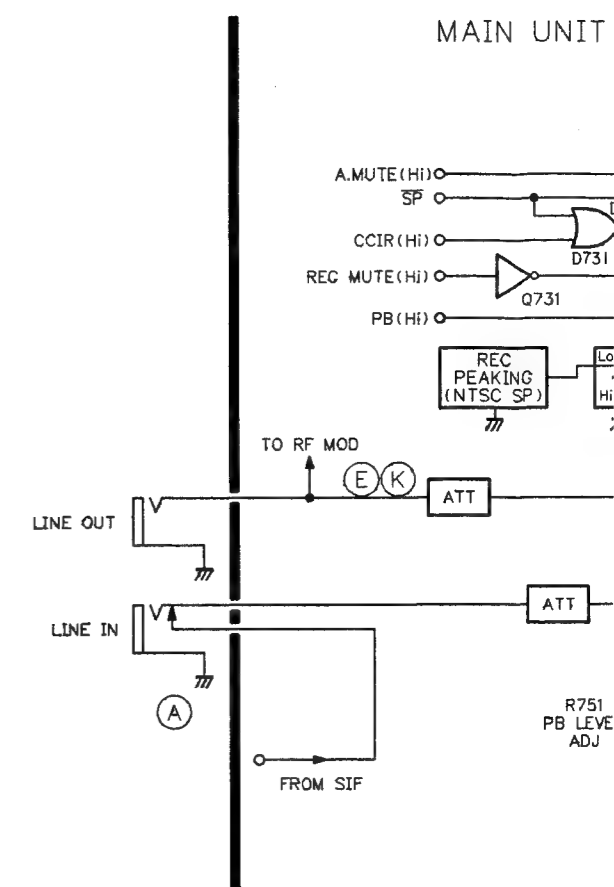


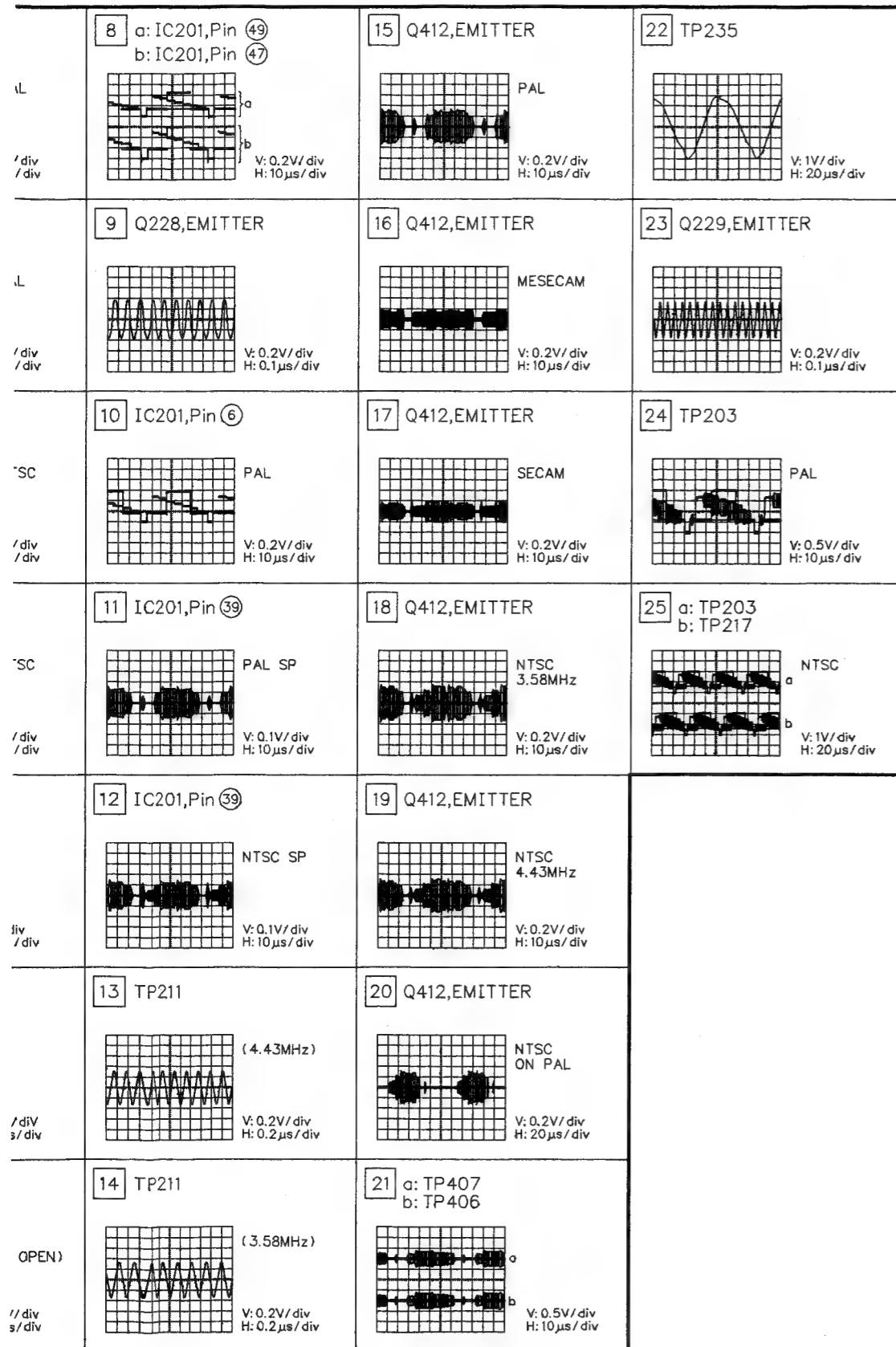
PLAY Mode

REC Mode

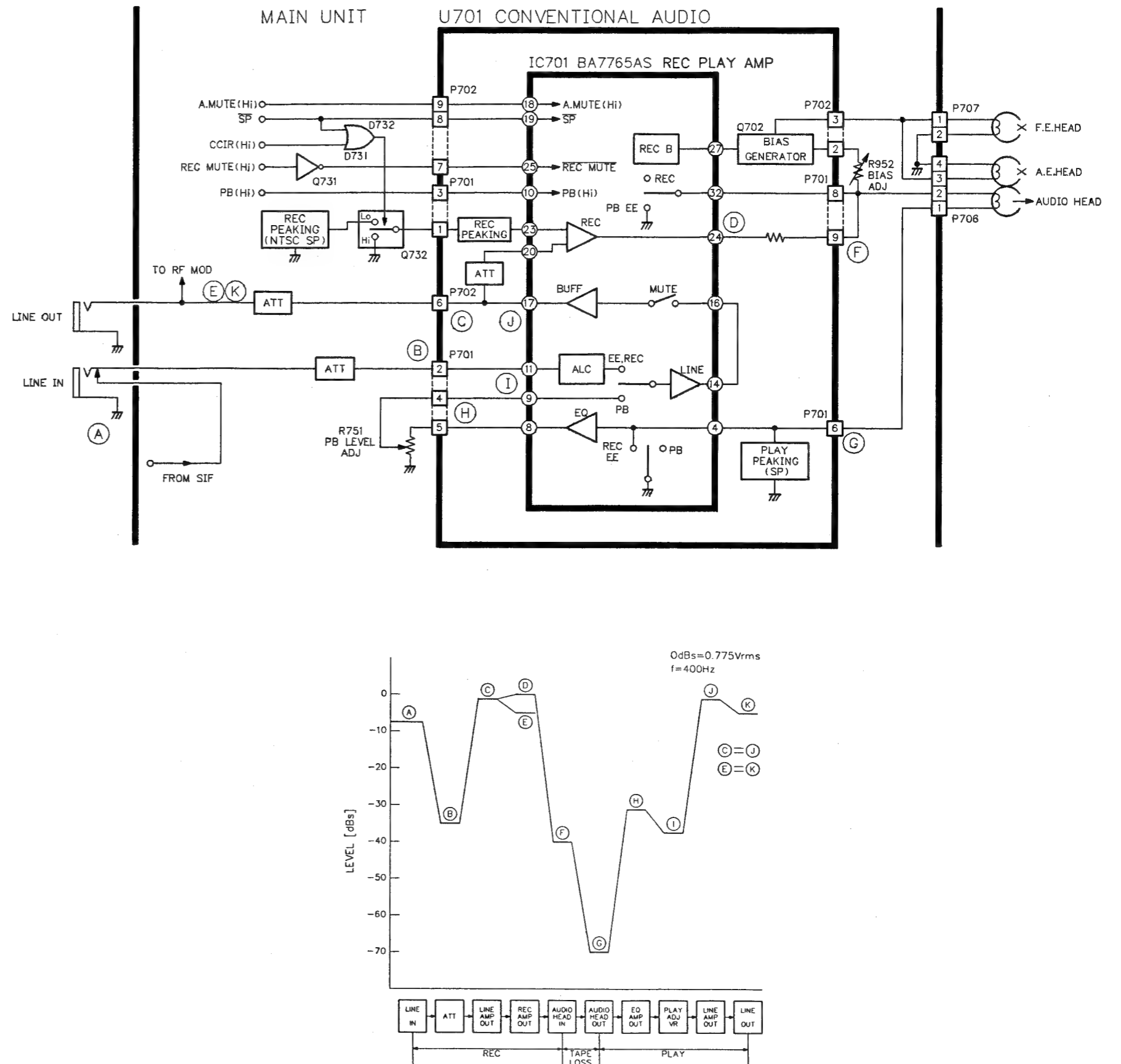


7-6. Audio Block Diagram





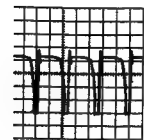
7-6. Audio Block Diagram



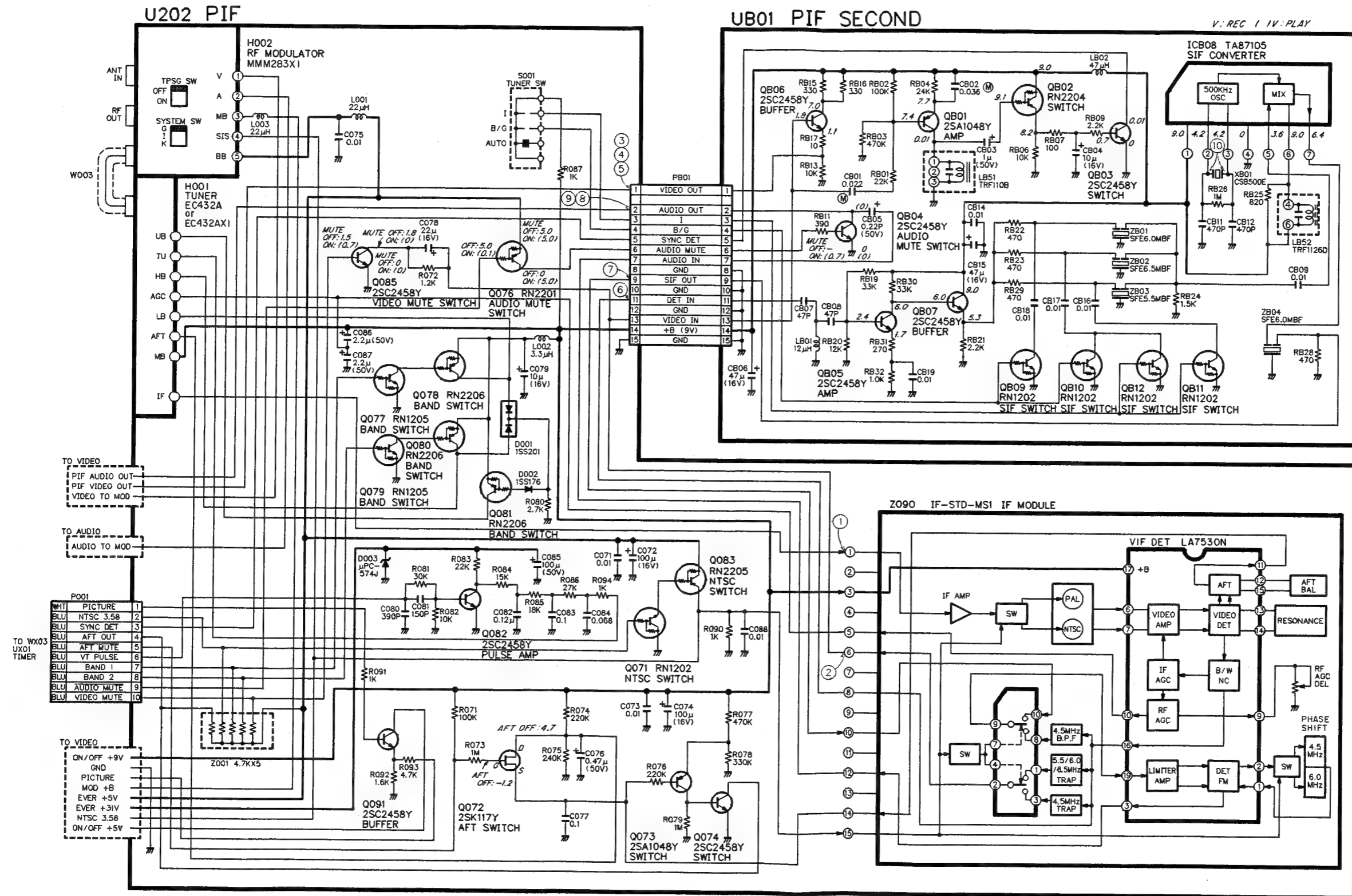
8-2. PIF Circuit Diagram



V: 1V/div
H: 5μs/div



V: 100V/div
H: 5μs/div



BAND SW (V)

	V _E	V _C	V _B	V _E	V _C	V _B	V _E	V _C	V _B
Q077	0	0	5	0	9	0	0	9	0
Q078	9	9	0	8	0	9	9	0	9
Q079	0	9	0	0	0	2	0	9	0
Q080	9	0	9	9	9	0	9	0	9
Q081	9	0	8.6	9	0	8.6	9	9	4.7

NTSC SW (V)

SYSTEM	NTSC 3.58	OTHER
Q071	0	0
Q083	5	5

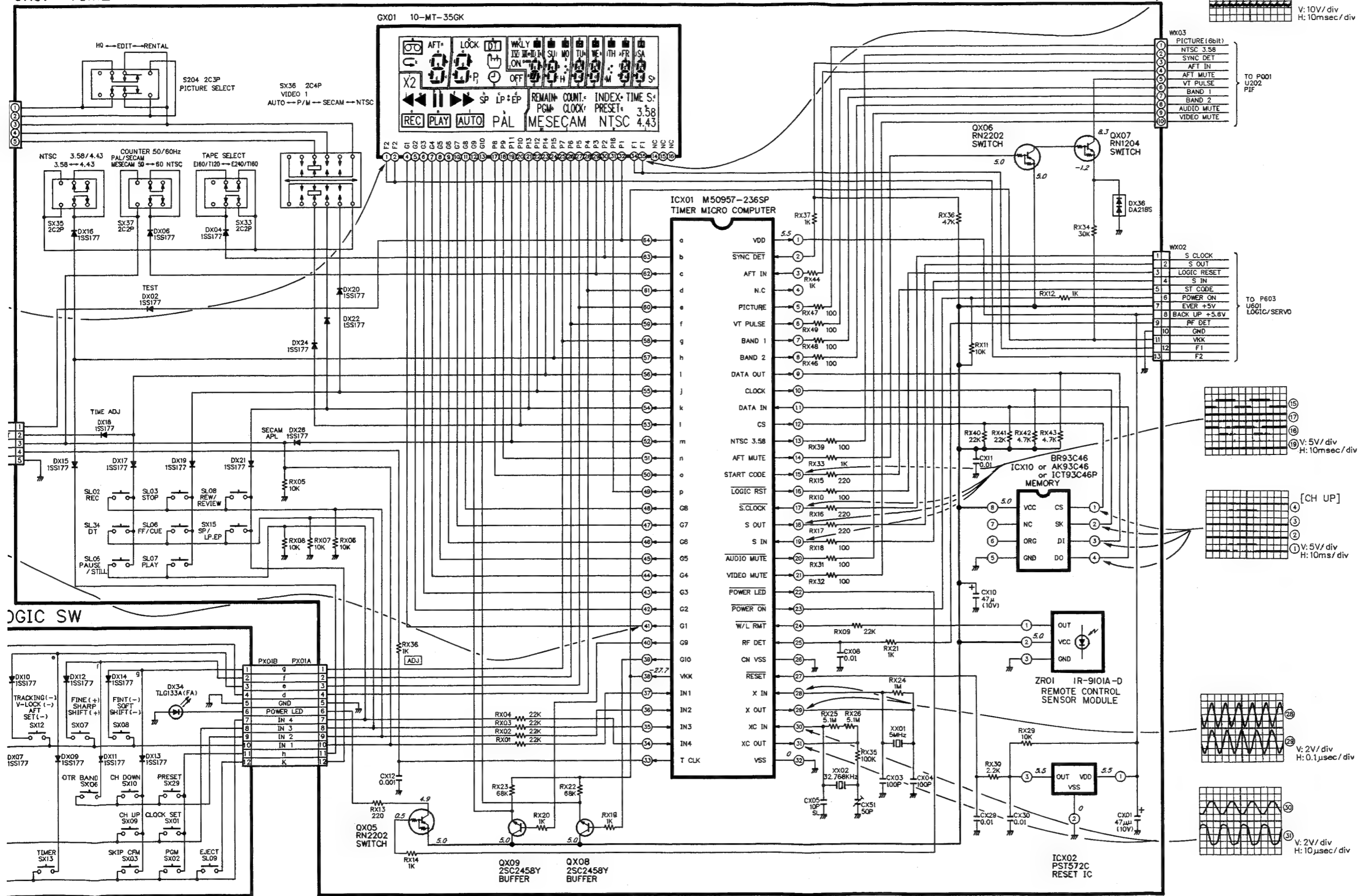
TUNER SW (SIF SW) (V)

TUNER SW	AUTO	B/G	I
Q009	0	0	0
Q010	0	0	0
Q011	0	0	0
Q012	0	0	0

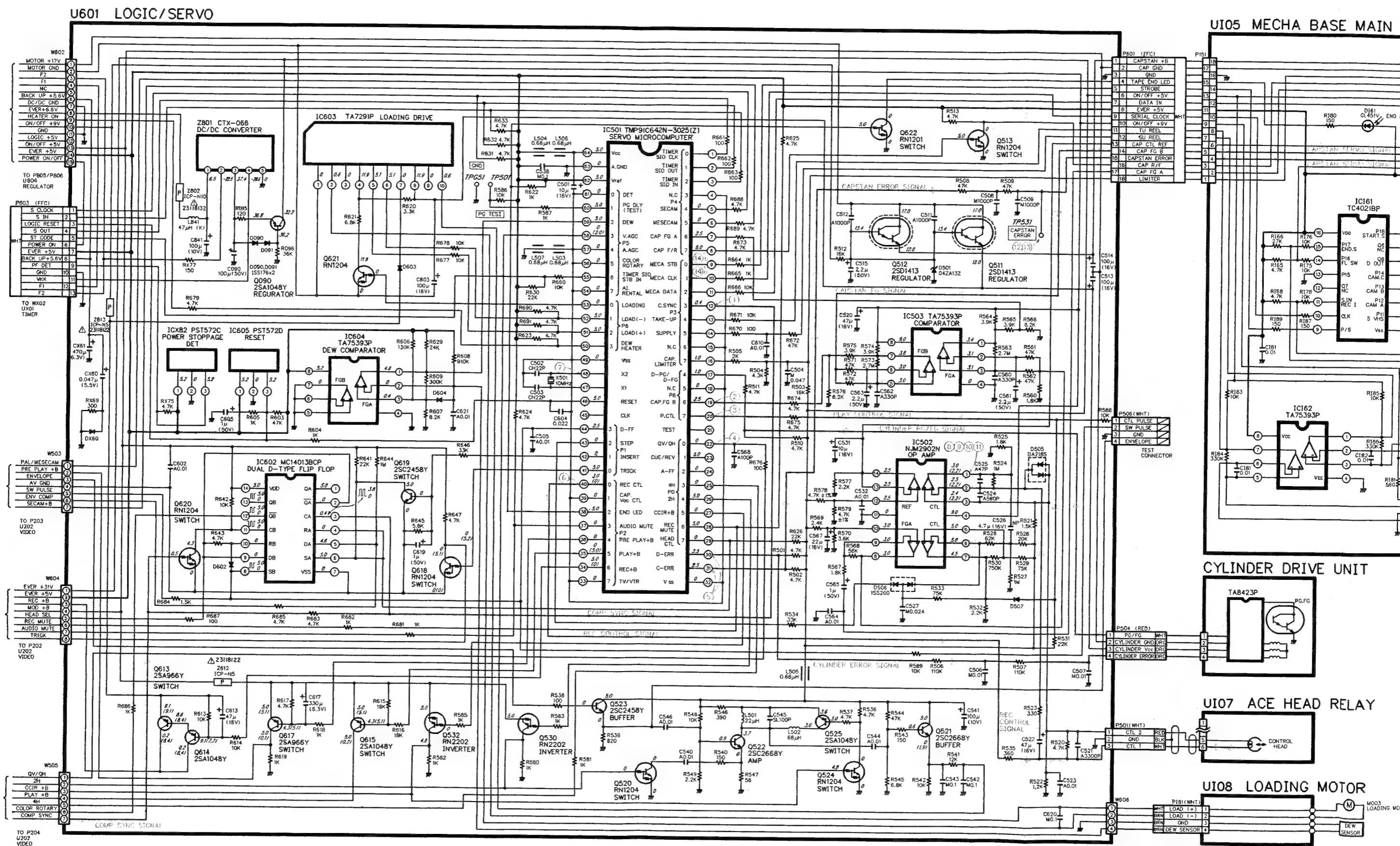
TUNER & BAND DATA (V)

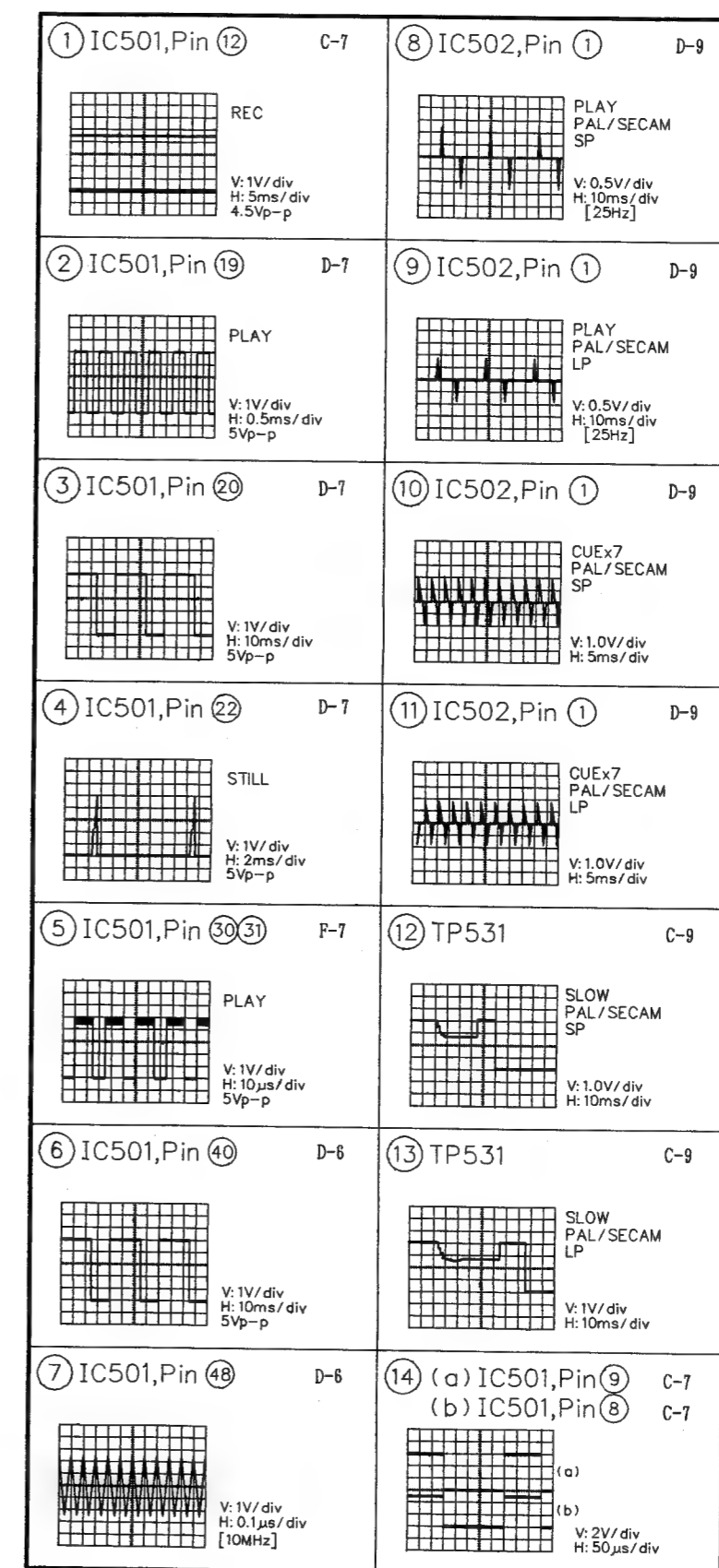
	V _E	V _C	V _B	V _E
BAND 1	5	0	0	0
BAND 2	0	2	0	0
LB	9	0	0	0
HB	0	9	0	0
UB	0	0	9	0

UX01 TIMER



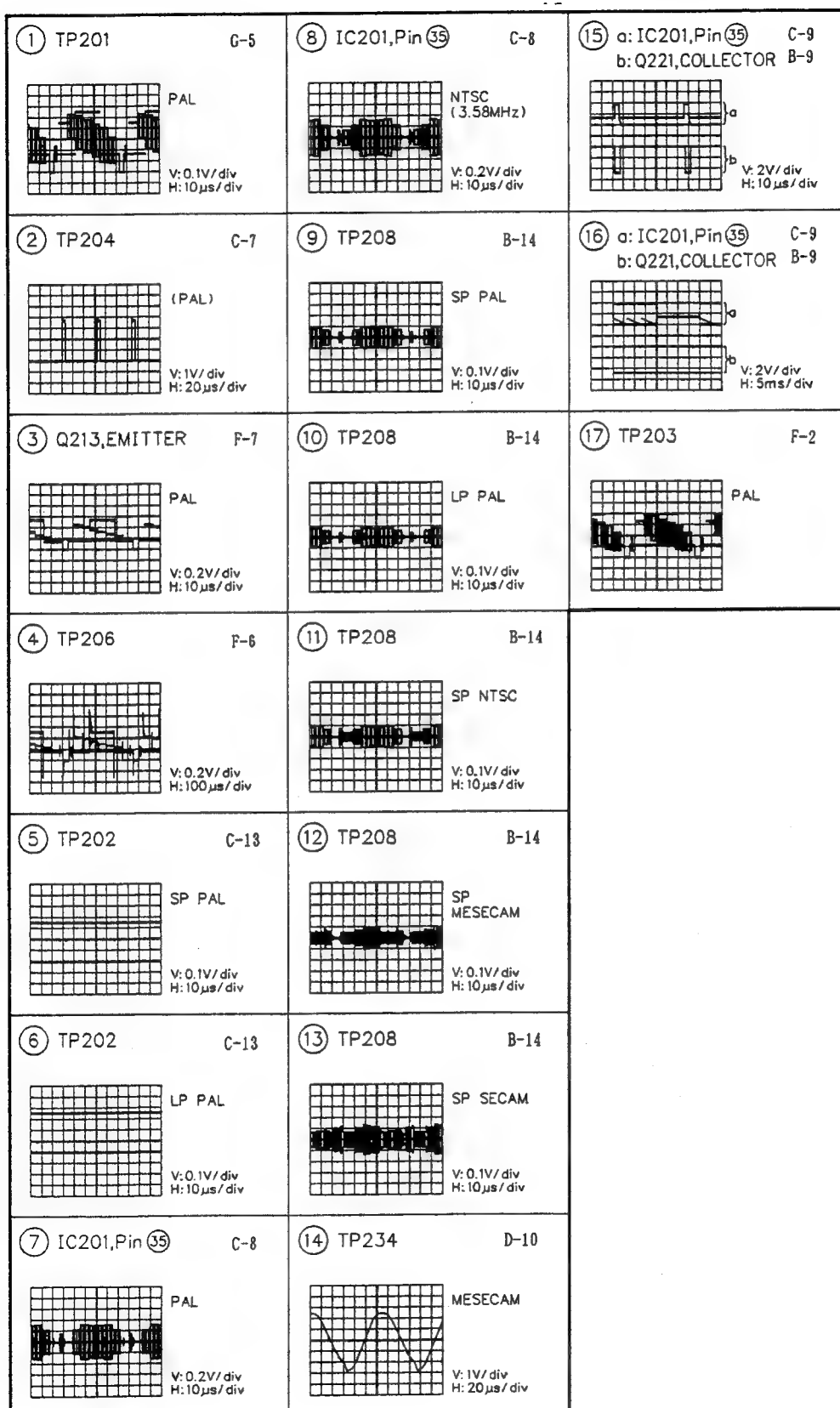
8-4. Logic/Servo Circuit Diagram





8-5. Video Circuit Diagram

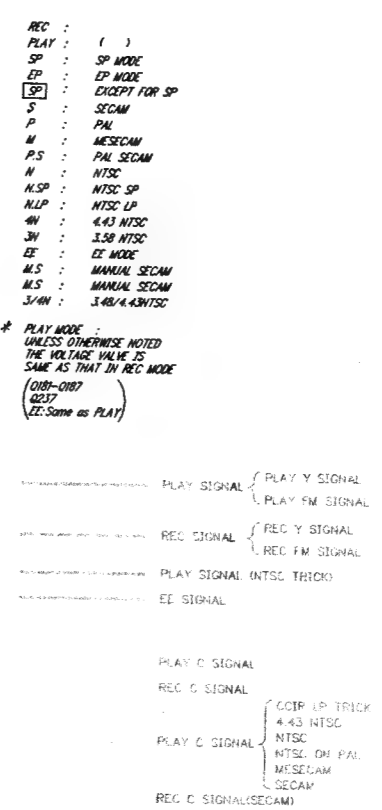
PLAY Mode



REC Mode

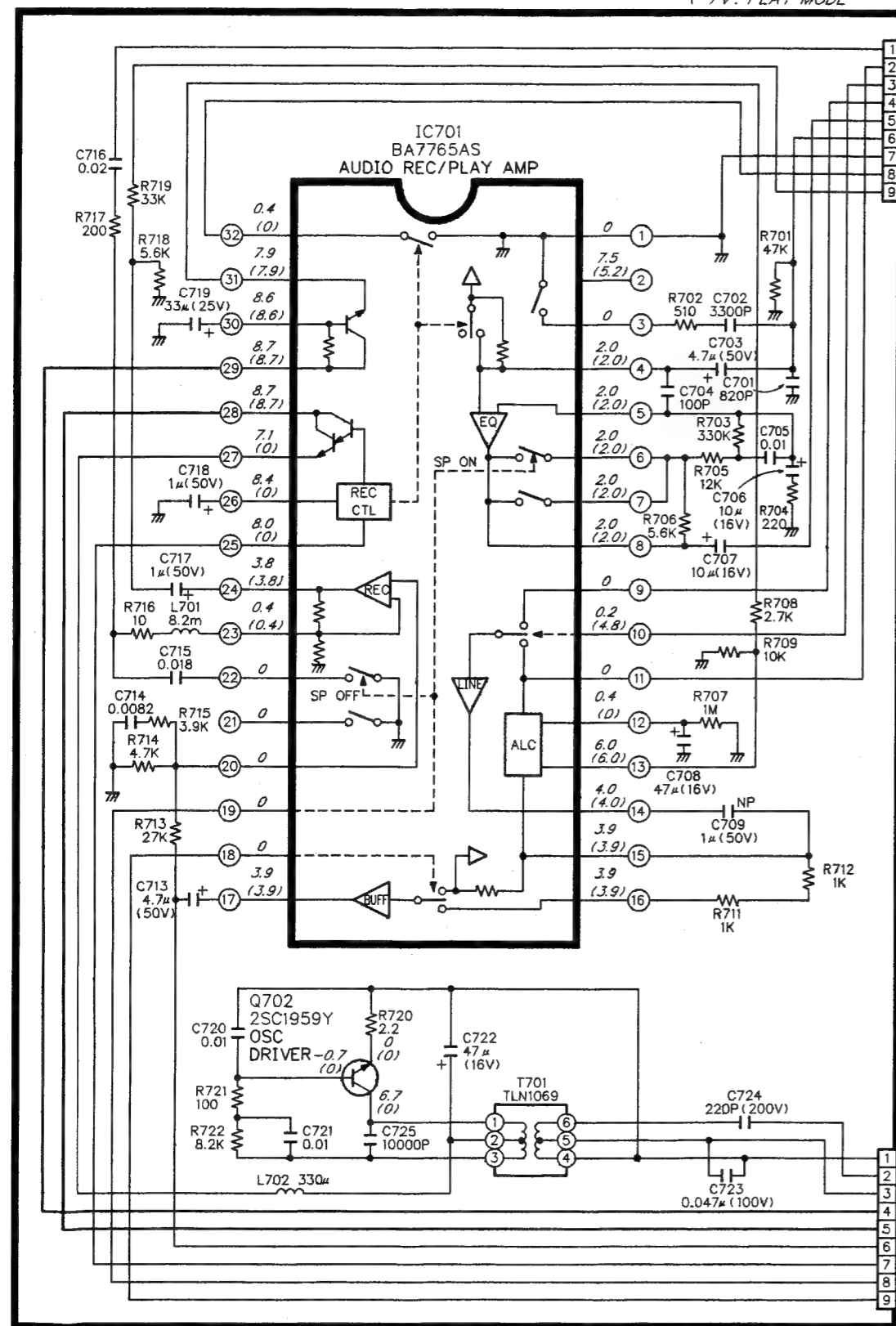
<p>1 TP101 A-2</p> <p>SP PAL</p> <p>V: 0.1V/div H: 5ms/div</p>	<p>8 a: IC201, Pin ④9 B-4 b: IC201, Pin ④7 C-4</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>15 Q412, EMITTER E-15</p> <p>PAL</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>22 TP235 E-13</p> <p>V: 1V/div H: 20μs/div</p>
<p>2 TP101 A-2</p> <p>LP PAL</p> <p>V: 0.1V/div H: 5ms/div</p>	<p>9 Q228, EMITTER B-3</p> <p>V: 0.2V/div H: 0.1μs/div</p>	<p>16 Q412, EMITTER E-15</p> <p>MESECAM</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>23 Q229, EMITTER D-3</p> <p>V: 0.2V/div H: 0.1μs/div</p>
<p>3 TP101 A-3</p> <p>SP NTSC</p> <p>V: 0.1V/div H: 5ms/div</p>	<p>10 IC201, Pin ⑥ F-6</p> <p>PAL</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>17 Q412, EMITTER E-15</p> <p>SECAM</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>24 TP203 F-2</p> <p>PAL</p> <p>V: 0.5V/div H: 10μs/div</p>
<p>4 TP101 A-3</p> <p>EP NTSC</p> <p>V: 0.1V/div H: 5ms/div</p>	<p>11 IC201, Pin ③9 C-7</p> <p>PAL SP</p> <p>V: 0.1V/div H: 10μs/div</p>	<p>18 Q412, EMITTER E-15</p> <p>NTSC 3.58MHz</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>25 a: TP203 F-2 b: TP217 F-3</p> <p>NTSC</p> <p>V: 1V/div H: 20μs/div</p>
<p>5 TP103 B-2</p> <p>PAL</p> <p>V: 1V/div H: 5ms/div</p>	<p>12 IC201, Pin ③9 C-7</p> <p>NTSC SP</p> <p>V: 0.1V/div H: 10μs/div</p>	<p>19 Q412, EMITTER E-15</p> <p>NTSC 4.43MHz</p> <p>V: 0.2V/div H: 10μs/div</p>	
<p>6 Q213, EMITTER F-7</p> <p>PAL</p> <p>V: 0.1V/div H: 10μs/div</p>	<p>13 TP211 F-8</p> <p>(4.43MHz)</p> <p>V: 0.2V/div H: 0.2μs/div</p>	<p>20 Q412, EMITTER E-15</p> <p>NTSC ON PAL</p> <p>V: 0.2V/div H: 20μs/div</p>	
<p>7 TP212 C-7</p> <p>PAL (SLIT OPEN)</p> <p>V: 0.2V/div H: 10μs/div</p>	<p>14 TP211 F-8</p> <p>(3.58MHz)</p> <p>V: 0.2V/div H: 0.2μs/div</p>	<p>21 a: TP407 E-16 b: TP406 D-18</p> <p>V: 0.5V/div H: 10μs/div</p>	



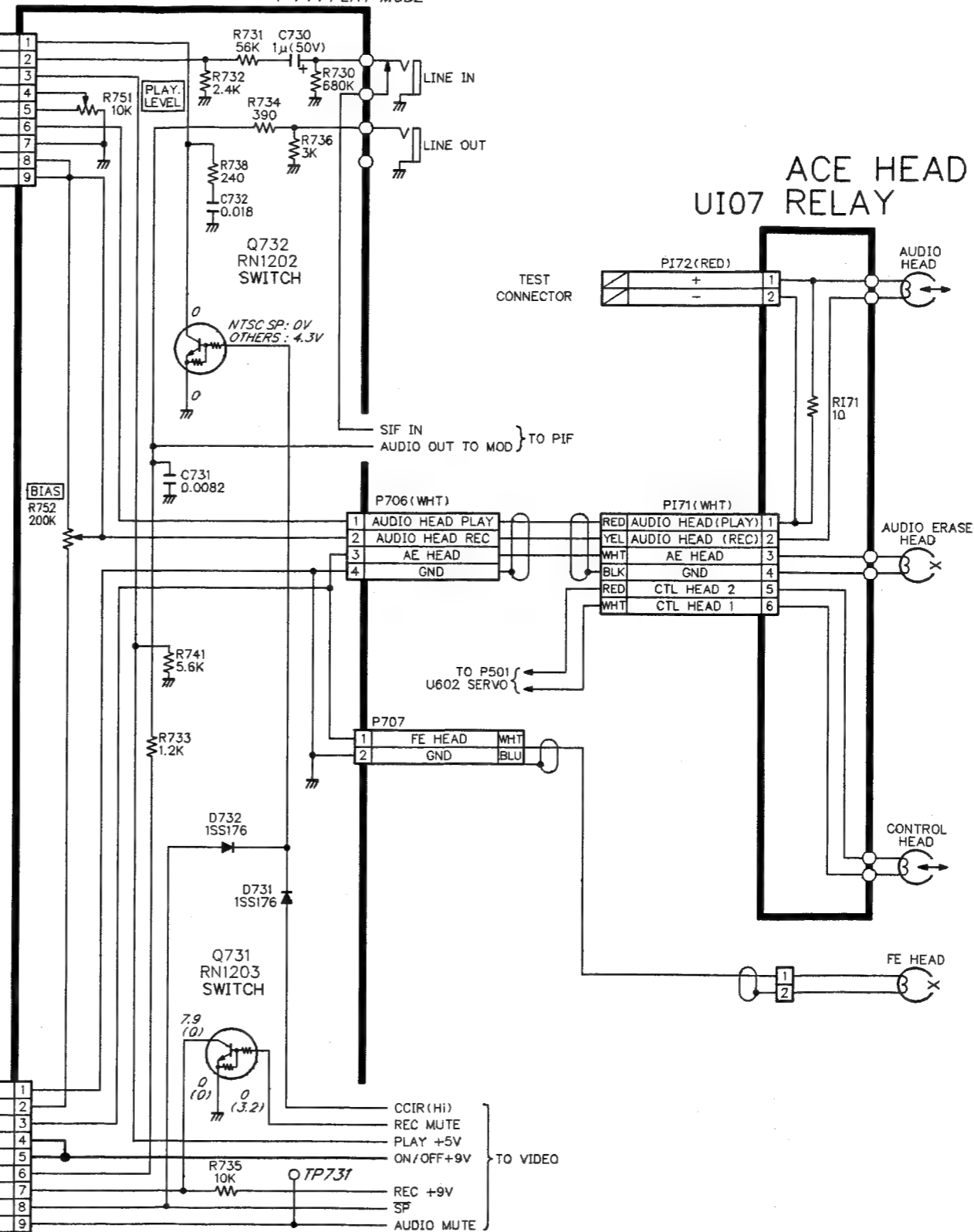


8-6. Audio Circuit Diagram

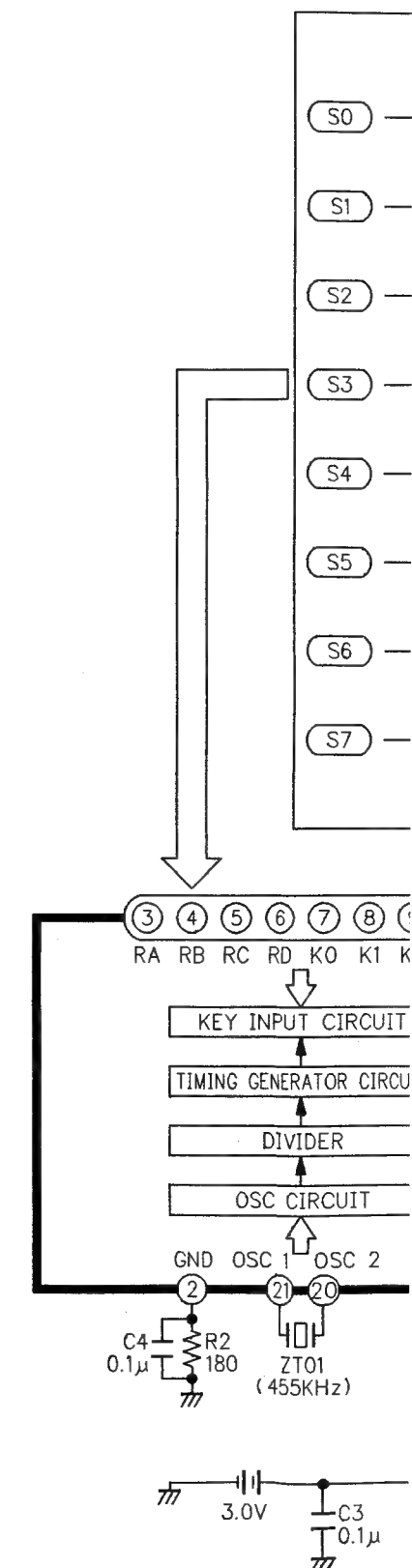
U701 CONVENTIONAL AUDIO

V: REC MODE
() V: PLAY MODE

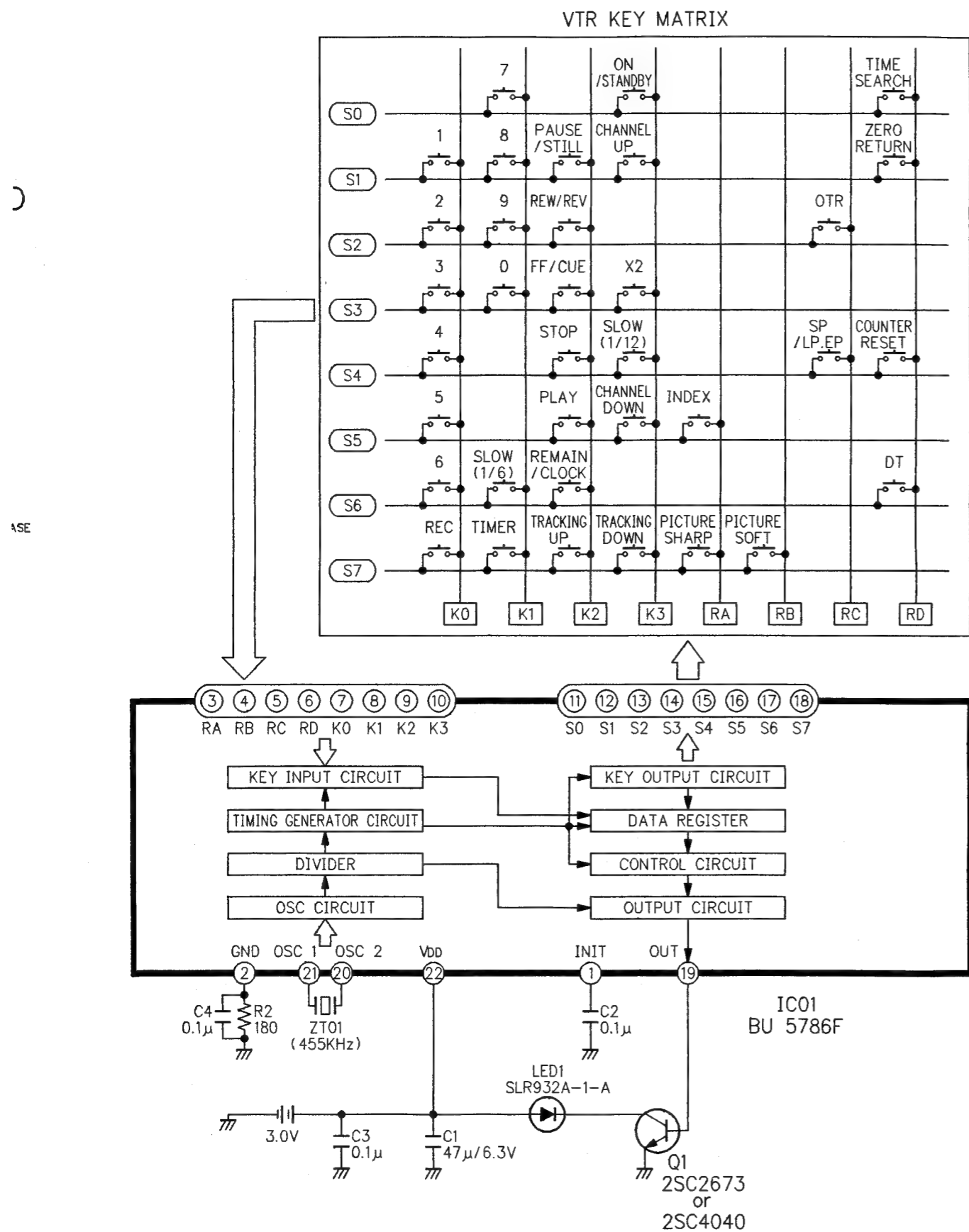
U202 AUDIO

V: REC MODE
() V: PLAY MODE

8-7. Remote Cotntrol Circuit Di



8-7. Remote Cotntrol Circuit Diagram



9. PC Boards 9-1. Power Supply PC Board

A

B

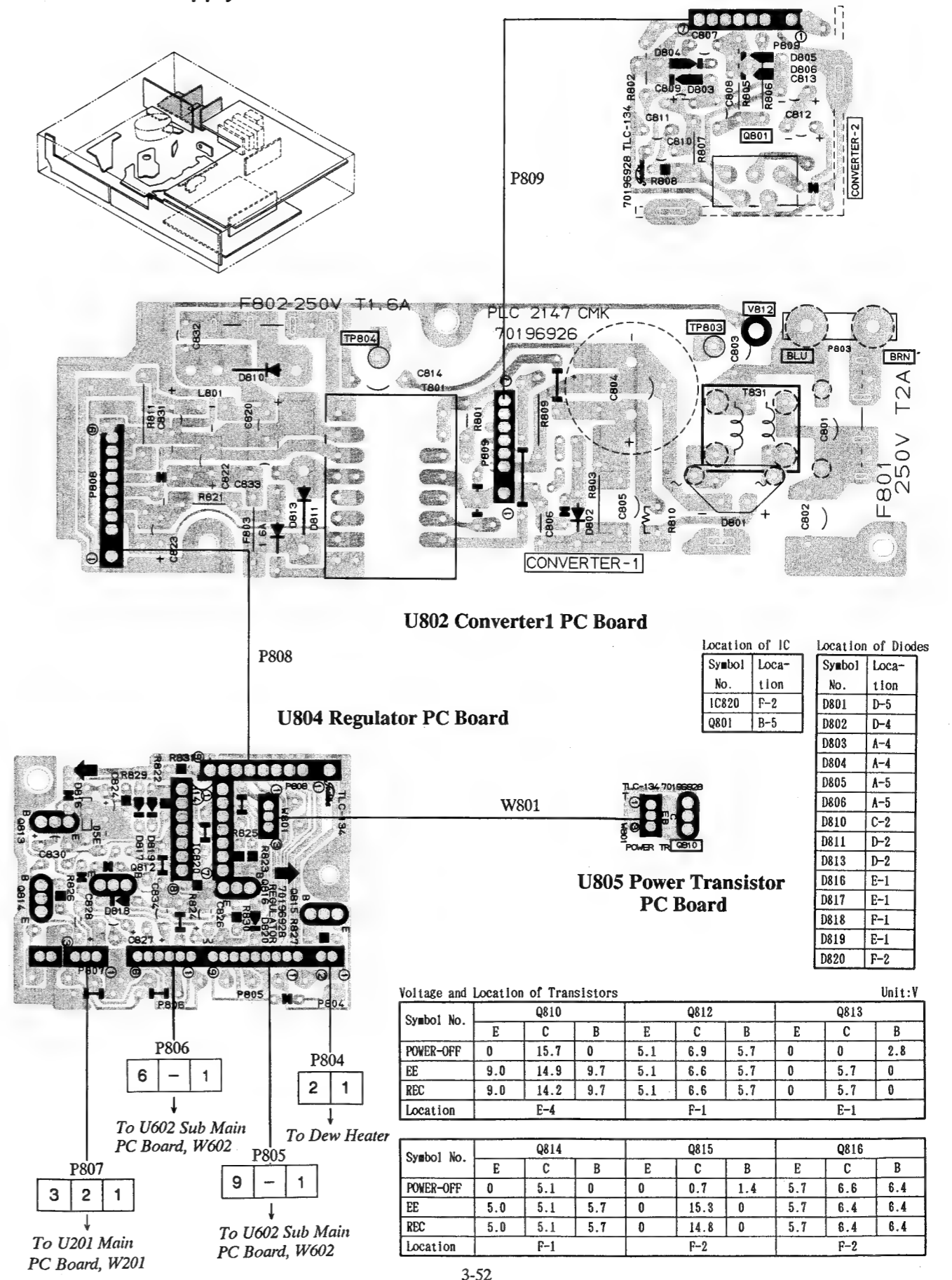
C

D

E

F

G



U602 Sub Main PC Board

P601 ↔ PI51

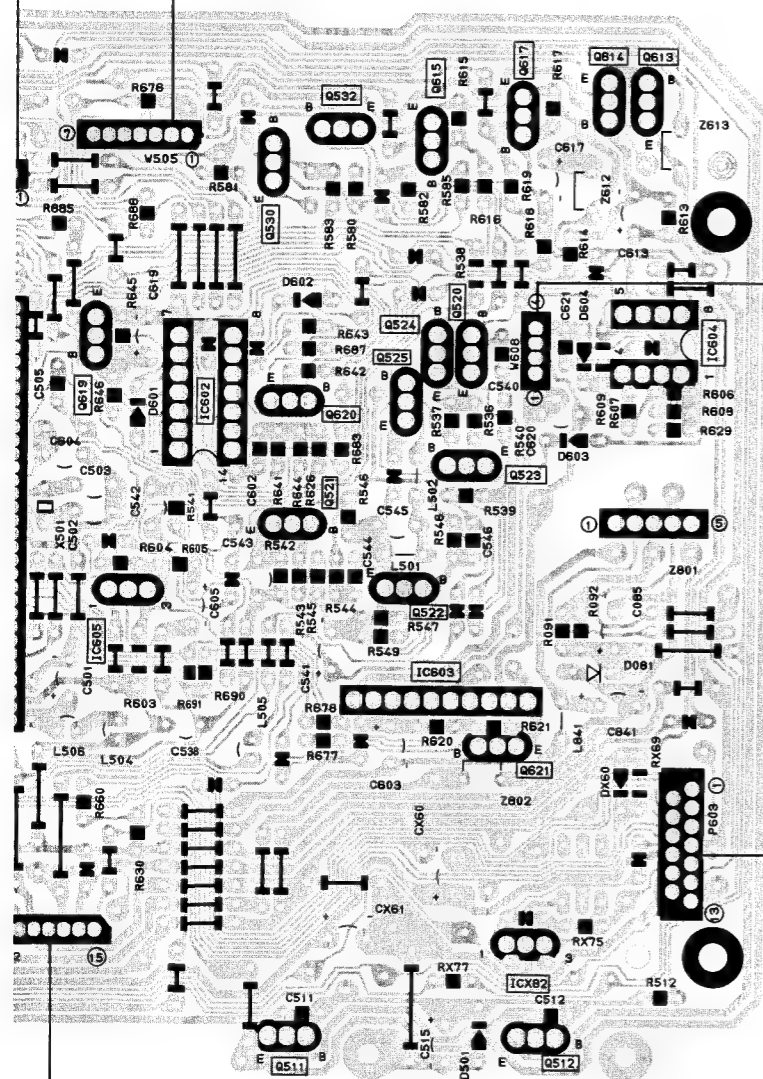
8 - 1 → To U202 Main PC Board, P202

W604

1 → To U202 Main PC Board, P203

7 - 1 → To U202 Main PC Board, P204

W505



W608 ↔ PI81

To UX01 Timer PC Board, WX02

- 15 → To U804 Regulator PC Board, P805, P806

W602

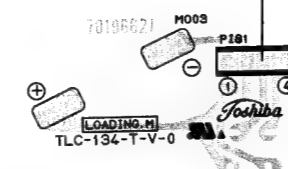
UI02 F/L PC Board

To Cam SW Relay ← PI54

PI21 ↔ WI21

UI08 Loading Motor PC Board

To Capstan Motor Relay



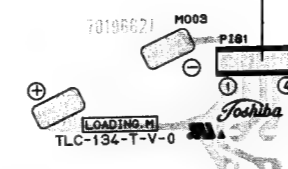
UI02 F/L PC Board

To Cam SW Relay ← PI54

PI21 ↔ WI21

UI08 Loading Motor PC Board

To Capstan Motor Relay



UI04 Mecha Base Sub PC Board

Location of ICs

Sym- bol	Loca- tion
IC161	E-14
IC162	E-14
ICX82	F-7
IC501	E-4
IC502	E-2
IC503	F-3
IC602	D-6
IC603	E-6
IC604	D-7
IC605	E-5

Location of Diodes

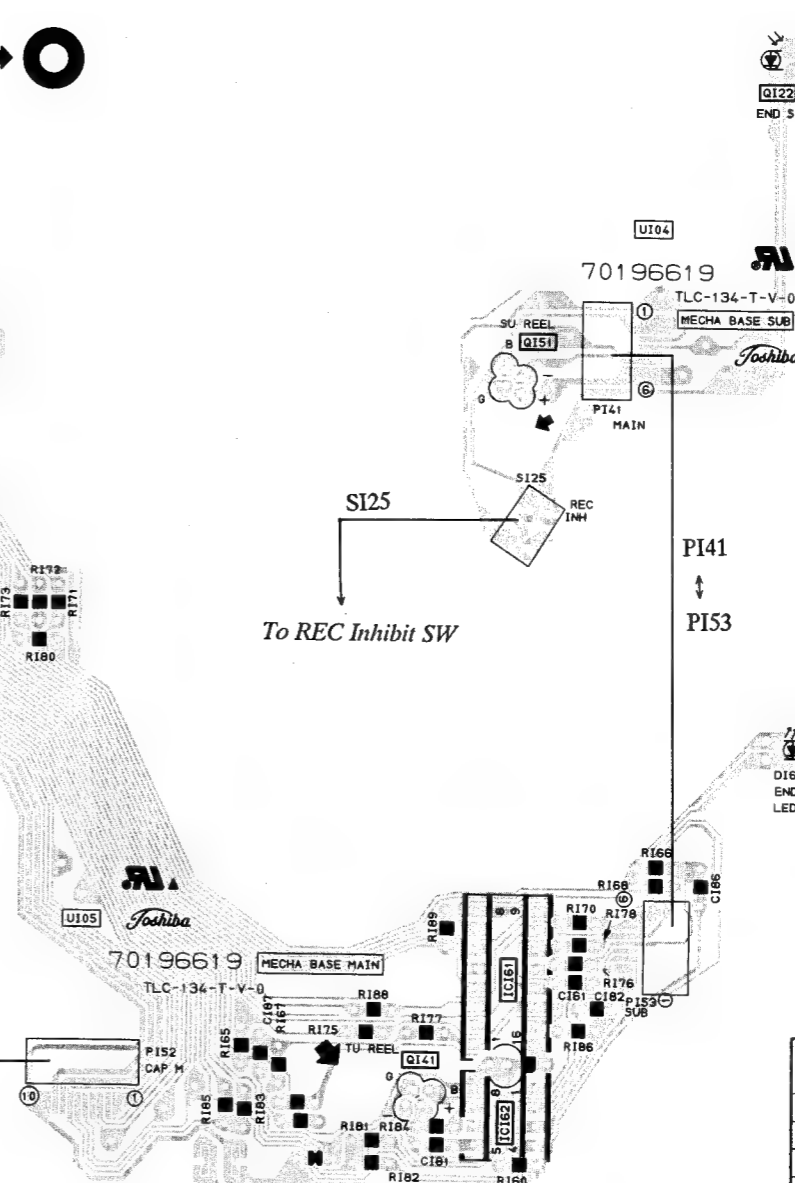
Sym- bol	Loca- tion
D090	
D091	
D501	G-6
D505	D-2
D506	E-3
D507	D-3
D602	D-6
D603	D-7
D604	D-7
DI61	D-15
DX60	F-7

Location of Transistors

Sym- bol	Volate (Unit:V)			Loca- tion
	E	C	B	
Q090	36.8	32.2	36.2	
Q511	12.0	17.0	13.4	G-6
Q512	12.0	17.0	13.4	G-7
Q513	0	0	5.0	E-3
Q520	0	0	0	D-6
Q521	0(1.9)	5.0	0.6	D-6
Q522	0	3.7	0.9	E-6
Q523	0	5.0	0	D-7
Q524	0	0	4.5	D-6
Q525	3.6	3.6	3.0	D-6
Q530	5.0			C-6
Q532	5.0	4.8	0	C-6
Q613	9.1(9.1)	0.2(8.4)	8.6(8.4)	C-7
Q614	8.6(8.4)	0.2(8.4)	9.1(7.7)	C-7
Q615	5.0(5.1)	5.0(0.2)	4.3(5.1)	C-6
Q617	5.0(5.1)	5.0(0.1)	4.3(5.1)	C-7
Q618	0(0)	0(5.1)	0(5.2)	C-4
Q619	0	5.0	0	D-5
Q620	4.3	0	0.5	D-6
Q621	0	11.9	0	F-7
Q622	0	0	5.0	C-4
Q121				B-9
Q122				A-15
Q141				E-12
Q151				B-14

UI05 Mecha Base Main PC Board

To REC Inhibit SW



9-3. Main (PIF, Video, Audio) PC Board

To U602 Sub Main PC Board, W505 ←

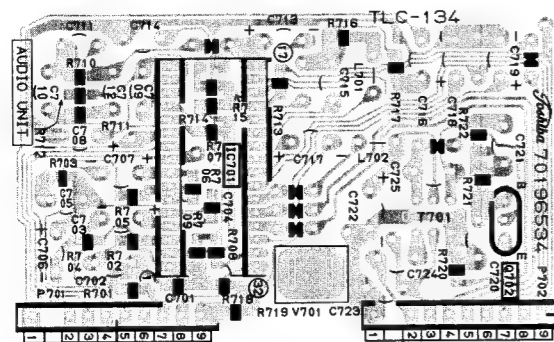
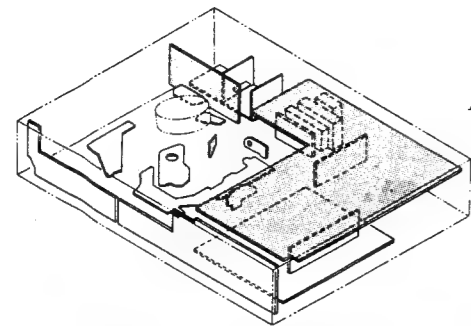
P204		
1	-	7

U202 Main (PIF, Video, Audio) PC Board

P206

1	-	5
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→ To UX01 Timer PC Board, WX04

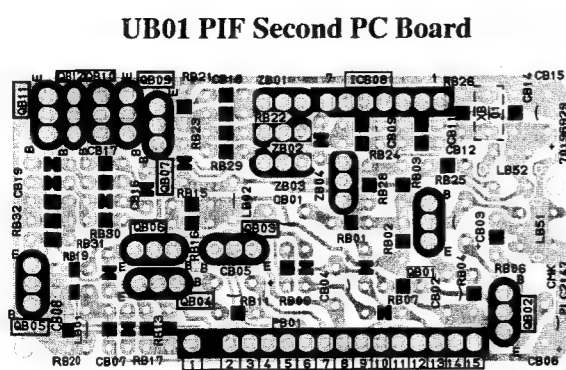


U701 Conventional Audio PC Board

P707

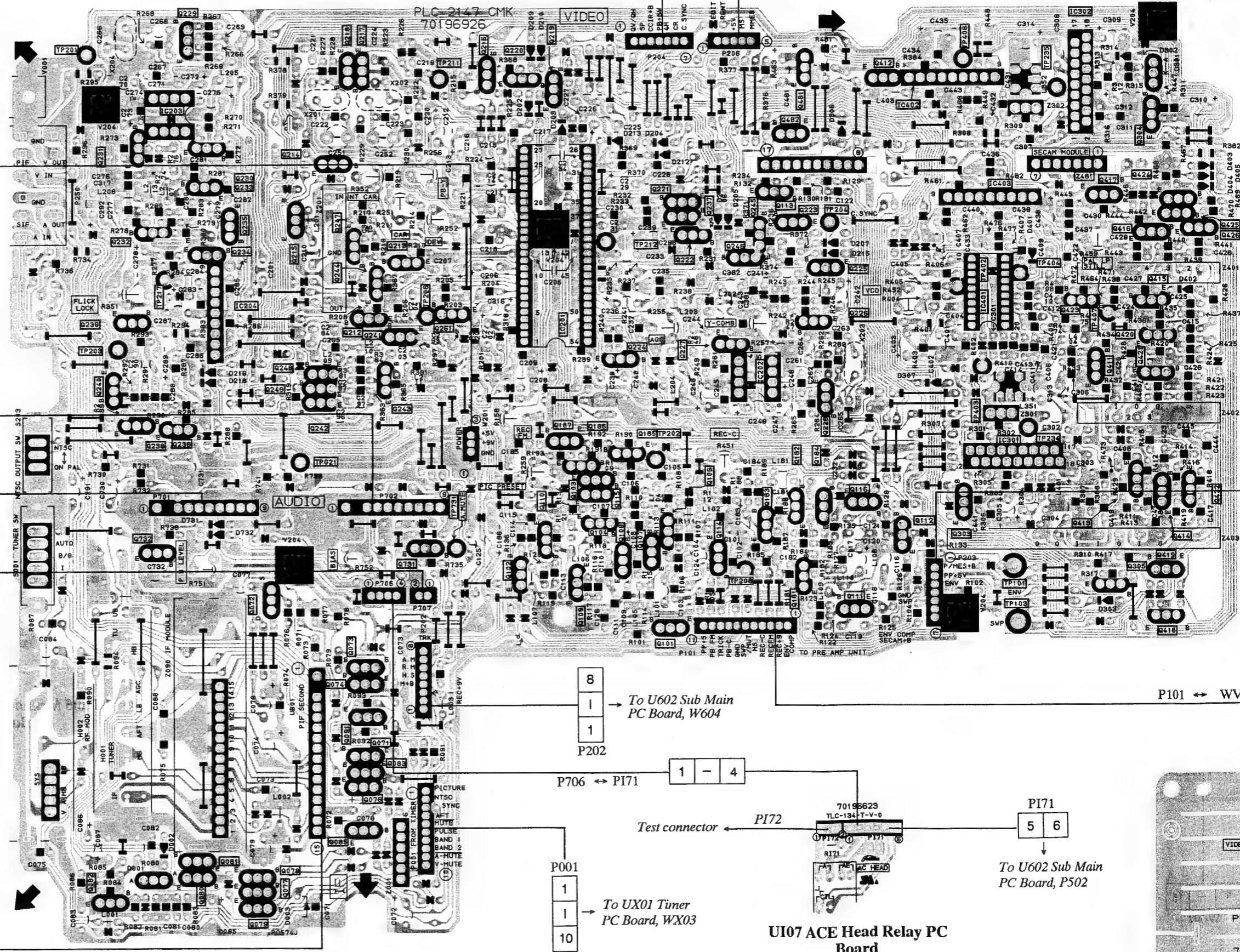
To Full Width Erase Head ←

2	1
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UB01 PIF Second PC Board

PB01 ↔ UB01



P706 ↔ PI71	1	-	4
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Test connector

1
→ To UX01 Tuner
PC Board, WX03

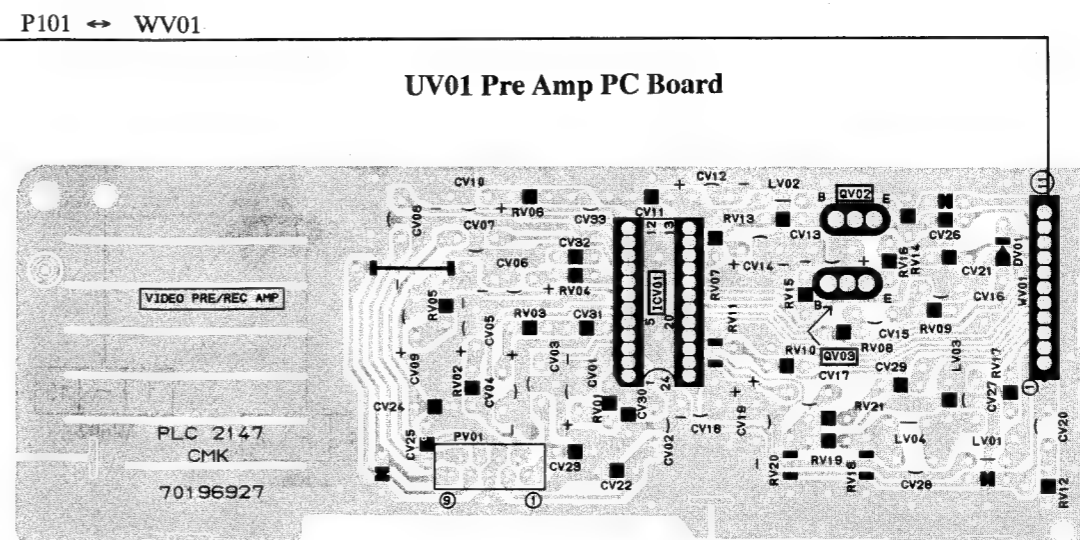
PI71

5	6
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↓

To U602 Sub Main
PC Board, P502

UI07 ACE Head Relay PC Board



Location of Transistors

V : REC. (V) : PLAY

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q101	0(0)	6.5~4.0 (0.1~2.5)	0(0)	E-8
Q102	0(0)	0(0)	0(2.5)	E-7
Q103	0	0		D-8
Q104	0	0		E-8
Q106	0(1.6)	0(3.3)	0(2.3)	D-9
Q107	0(3.9)	0(1.3)	0(3.3)	E-8
Q108	0(3.2)	0(4.9)	0(3.9)	E-8
Q109	0(2.3)	(0)	0(1.6)	E-8
Q110	0(1.6)	0(4.9)	0(2.3)	D-7
Q111	0(0.5)	0(4.9)	0(1.2)	E-10
Q112	0(4.9)	0(4.9)	0(0)	E-10
Q113	0(0.6)	0(2.6)	0(1.2)	B-9
Q114	0(0)	0(0)	4.5(4.5)	E-9
Q115	0(0)	0(0)		D-8
Q116	0(4.2)	0(4.9)	0(4.9)	D-10
Q181	(0)	0(0)	(0)	E-9
Q182	1.1(0)	8.0(0)	1.8(0)	D-9
Q183	1.8(0)	6.3(0)	2.5(0)	D-9
Q184	0(0)	(0)		D-9
Q185		0(0)	(0)	D-8
Q186	0(0)	(0)		D-8
Q187	1.4(0)	0(0)	0.7(1.1)	D-8
Q212	0			C-6
Q213	1.6(1.9)	0(0)	0.9(1.3)	C-6
Q214	0(0)			B-6
Q215	0(0)	0(0)		C-6
Q216	0(0)	0~2.7 (0~2.7)	0(0)	A-7
Q217	1.3(1.3)	5.0(5.0)	2.0(2.0)	A-6
Q218	1.3(1.3)	5.0(5.0)	0.3(0.3)	A-6
Q219	0(0)	3.0(3.0)	0(0)	A-7
Q220	0(0)	0(0)	4.4(4.4)	A-7
Q221	0	4.9~0.1 (4.9~0.1)	0.1~1.8 (0.1~1.8)	B-8
Q222	0(0)	0(0)	0(4.1)	D-8
Q223	0(0)		0(0)	B-9
Q224	0(0)		0(0)	C-8
Q225	4.0(4.0)	1.4(1.4)	3.3(3.3)	C-10
Q226	2.4(2.4)	0(0)	1.7(1.7)	C-10
Q227	2.7(2.7)	5.0(5.0)	3.4(3.4)	C-8
Q228	0.5(0.5)	1.2(1.2)	1.1(1.1)	D-9
Q229	0(0.5)	0.1(1.2)	0.1(1.1)	A-5
Q230	0.1(1.3)	0(0)	1.8(1.6)	B-5
Q231	0(2.7)	0(4.8)	0(3.4)	B-4
Q232	8.0(8.0)	2.0(2.0)	7.3(7.3)	C-4
Q233	1.3(1.3)	6.8(6.8)	2.0(2.0)	B-5
Q234	6.1(6.1)	8.7(8.7)	6.8(6.8)	C-5
Q235	0(0)	0(0)	0(0)	C-5
Q236	4.5(0)	7.2(7.2)	4.9(0)	D-5
Q237	0(0)	0(4.1)	8.0(0)	B-9
Q238	0(0)	4.5(0)	0(4.9)	D-5
Q239	4.2(4.2)	0(0)	3.5(3.5)	C-4
Q240	5.8(5.8)	8.7(8.7)	6.5(6.5)	D-4
Q241	1.8(1.8)	0(0)	1.1(1.1)	C-6
Q242	0(0)	0(0)		D-6
Q243	1.1(1.1)	4.9(4.9)	1.8(1.8)	D-6
Q244	0(0)	0(2.4)	0(0)	C-6
Q245	0(0)	0.7(0)	0.1(4.8)	B-9
Q246	0(0)	0(2.6)	0.7(0)	C-9
Q247	0(0)	0(0)	0(4.9)	C-6

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q248	0(0)	4.5(4.5)	0(0)	C-6
Q249	0(0)	0(0)	4.5(4.5)	D-6
Q261	1.8(2.3)	5.0(5.0)	2.4(2.9)	C-7
Q303	0(0)	0(0)		E-10
Q304	0(0)	0(0)		B-12
Q305	0(0)	4.5(4.5)	0(0)	E-11
Q411	1.7(1.7)	5.0(5.0)	2.3(2.8)	C-11
Q412	2.9(2.9)	0(0)	2.2(2.2)	A-10
Q413	2.5(2.5)	5.0(5.0)	3.2(3.2)	E-11
Q414	0.8(0.8)	3.2(3.2)	1.5(1.5)	E-12
Q415		5.0(5.0)	2.0(2.0)	C-12
Q416	1.0(1.0)	2.8(2.8)	1.7(1.7)	C-11
Q417	3.4(3.4)	1.5(1.5)	2.8(2.8)	B-11
Q418	5.0(5.0)			E-12
Q419				E-12
Q420	1.5(1.5)	5.0(5.0)	0(0)	C-11
Q421	1.5(1.5)	5.0(5.0)	0(0)	C-11
Q422	1.5(1.5)	5.0(5.0)	2.1(2.1)	D-12
Q423	1.7(1.7)	5.0(5.0)	2.3(2.3)	C-11
Q424	0(0)			B-12
Q425	0(0)	0~4.6 (0~4.6)	0~4.0 (0~4.0)	C-12
Q426	0~4.0 (0~4.0)	5.0(5.0)	0~4.6 (0~4.6)	C-12
Q481	4.9(0.4)	5.0(5.0)	5.8(0)	B-9
Q482	0(1.6)	5.0(5.0)	0(2.2)	B-9
Q702	0(0)	6.7(0)	-0.7(0)	D-3
Q731	0(0)	7.9(0)	0(3.2)	E-6
QV02	0(1.8)	0.3(5.0)	0(2.5)	F-15
QV03	0(2.3)	0.3(5.0)	0(2.9)	G-15

V : PAL SECAM. (V) : NTSC

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q104			0(4.9)	E-8
Q214		REC: 2.2(0) PLAY: 3.6(0)	0(4.9)	B-6
Q215			0(4.9)	C-6
Q242			0(4.9)	D-6
Q303			0(4.3)	E-10
Q304			0(4.4)	B-12
Q415	4.3(1.4)			C-12
Q418		0(4.9)	4.9(0.3)	E-12
Q419	0	0	0	E-12

V : PAL SECAM SP. (V) : PAL SECAM LP

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q223		3.4(3.8)		B-9

V : NTSC SP. (V) : NTSC LP. <V> : NTSC EP

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q216		0	4.6	A-7
Q220		4.6	0	A-7
Q222			0	D-8
Q223		2.5<3.4>		B-9
Q224	(0)	(0)	(4.9)	E-8
Q237		PLAY: 0		B-9

V : REC EE

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q101		0	2.3	E-8
Q102		2.3		E-7
Q238		0		D-5
Q481	0.4		0	B-9

V: SECAM (V): MESECAM

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q112			(4.2)	E-10
Q114			0	E-9
Q219		0(0)	3.8(3.8)	A-7
Q305		0	4.2	E-12

V : SP. (V) : EXCEPT FOR SP

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q103			0(4.9)	D-8
Q115			0(4.9)	D-8
Q181	REC: 1.8(1.6)		REC: 1.1(0.9)	E-9
Q184		REC: 1.1(0)	0(4.9)	D-9
Q185	REC: 2.1(1.7)		REC: 1.4(1.0)	D-8
Q186		REC: 1.4(0)	0(4.9)	D-8
Q212		PLAY: 2.4(0)	0(4.9)	C-6
Q224		0.1(4.9)		D-8
Q424		4.6~4.0(0)	(0.7)	B-12

V : 3.58NTSC. (V) : 4.43NTSC. <V> : 3.58/4.43NTSC

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q217	3.2			A-6
Q218	3.2			A-6
Q219	3.2		3.9	A-7
Q235			5.0	C-5
Q419	<4.9>	0(4.9)	5.0(0.3)	E-12
Q420	3.2(3.1)		0(3.8)	C-11
Q421	3.2(3.1)		3.9(0.3)	C-12
Q422	3.2(3.1)		<2.2>	D-12

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q072				E-5
Q073				E-6
Q074				F-6
Q082				C-4
Q083				F-6
Q091				F-6
QB01	7.7	0.01	7.4	F-2
QB02	8.2	9.0	9.1	F-3
QB03	0	0.01	0.7	F-2
QB04				F-2
QB05	1.7	6.0	2.4	F-1
QB06	1.1	0	0.8	F-1
QB07	5.3	9.0	6.0	E-1

BAND SW V: VL. (V): VH. <V>: U

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q077	0(0)<0>	0(9)<9>	5(0)<0>	C-6
Q078	9(9)<9>	9(0)<0>	0(9)<9>	C-6
Q079	0(0)<0>	9(0)<9>	0(2)<0>	G-5
Q080	9(9)<9>	0(9)<0>	9(0)<9>	G-5
Q081	9(9)<9>	0(0)<9>	8.6(8.6)<4.7>	G-5

TUNER SW (SIF SW) V: AUTO. (V): B/G. <V>: I

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
QB09	0(0)<0>	0(0)<0>	0(7.4)<0>	F-1
QB10	0(0)<0>	0(0)<0>	0(7.4)<0>	F-1
QB11	0(0)<0>	0(0)<0>	0(0)<7.4>	F-1
QB12	0(0)<0>	0(0)<0>	0(0)<7.4>	F-1

NTSC SW V: NTSC 3.58. (V): Other

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q071	0(0)	0(5)	3.5(0)	F-6
Q083	5(5)	5(0)	0(5)	F-6

V: MUTE ON. (V): MUTE OFF

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
Q076	5.0(5.0)	5.0(0)	0.1(5.0)	F-6
Q085	0(0)	0(1.8)	0.7(1.5)	C-6

Location of ICs

Sym- bol	Loca- tion
ICB08	F-2
IC201	C-7
IC202	D-9
IC203	B-5
IC204	C-5
IC301	D-11
IC302	A-11
IC401	C-10
IC402	B-10
IC403	B-11
IC701	C-2
ICV01	G-14

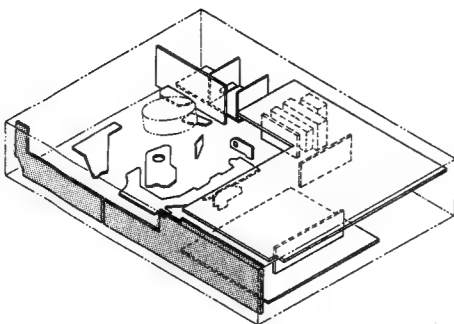
Location of Adjusting VRs

Sym- bol	Loca- tion
R251	B-6
R252	C-7
R255	C-8
R256	B-7
R257	C-9
R259	D-7
R351	C-4
R352	B-6
R451	D-9
R459	C-11
R751	E-5
R752	E-6

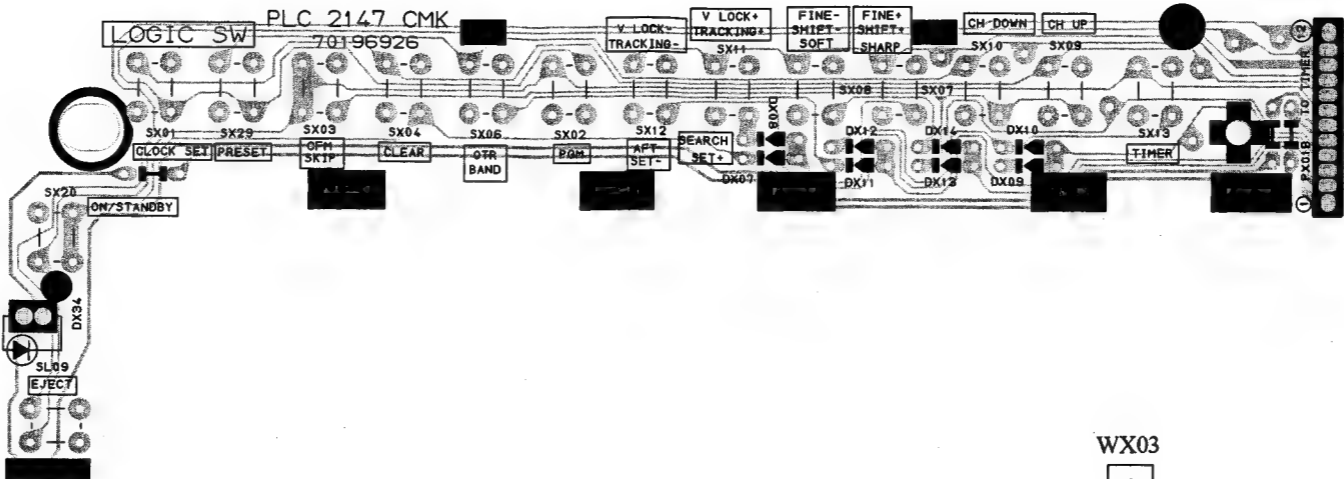
Location of Diodes

Sym- bol	Loca- tion
D001	
D002	G-5
D003	G-6
D202	B-7
D203	B-7
D204	B-8
D205	B-9
D206	B-9
D207	C-10
D209	A-7
D210	A-7
D212	B-8
D213	B-8
D215	C-10
D216	D-5
D218	D-5
D301	A-12
D302	A-12
D303	E-11
D306	B-9
D307	D-10
D401	C-11
D402	C-12
D403	B-12
D404	B-12

9-4. Timer PC Board



UL01 Logic SW PC Board



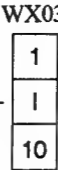
Location of ICs

Sym- bol	Loca- tion
ICX01	E-4
ICX02	E-3
ICX10	E-8

Location of Diodes

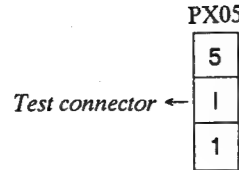
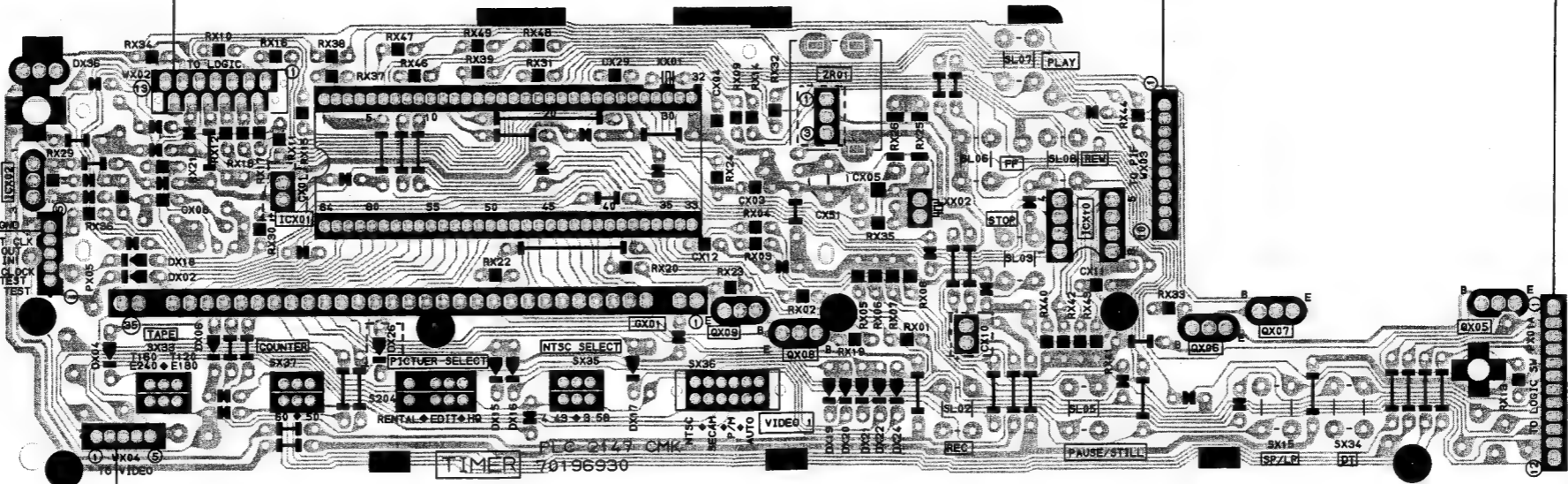
Sym- bol	Loca- tion
DX02	E-4
DX04	F-3
DX06	F-4
DX07	B-7
DX08	B-7
DX09	B-8
DX10	B-8
DX11	B-7
DX12	B-7
DX13	B-7
DX14	B-7
DX15	F-5
DX16	F-5
DX17	F-6
DX18	E-4
DX19	F-7
DX20	F-7
DX21	F-7
DX22	F-7
DX24	F-7
DX26	F-5
DX34	C-4
DX36	E-3

To U202 Main PC Board, P001 ←



PX01B
↓
PX01A

UX01 Timer PC Board

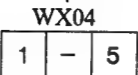


Test connector ←

Location of Transistors

Sym- bol	Voltage (Unit:V)			Loca- tion
	E	C	B	
QX05	5.0	4.9	0.5	F-9
QX06	5.0		5.0	F-6
QX07	-1.2	8.3		F-9
QX08		5.0		F-7
QX09		5.0		F-6

To U202 Main PC Board, P206 ←



SECTION 4 PARTS LIST

SAFETY PRECAUTION

The parts identified by Δ mark are critical for safety. Replace only with part number specified.
The mounting position of replacement is to be identical with originals. The substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

NOTICE

The part number must be used when ordering parts in order to assist in processing, be sure to include the model number and description.

Parts marked # are of chip type and mounted on original PC boards.

However, when they are placed for servicing works, use discrete parts listed on the parts list.

ABBREVIATIONS

1. Integrated circuit (IC)

2. Capacitor (Cap)

- Unit Ex.
F farad
MF microfarad ($\mu\text{F} = 10^{-6}\text{F}$) 10MF = 10 μF
PF picofarad ($\text{pF} = 10^{-12}\text{F}$) 10PF = 10pF
- Capacitance tolerance (for nominal capacitance higher than 10pF)

Symbol	B	C	D	F	G	J	K	M	N
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20	± 30

Symbol	P	Q	T	U	V	W	X	Y	Z
Tolerance %	+100 0	+30 -10	+50 -10	+75 -10	+20 -10	+100 -10	+40 -20	+150 -10	+80 -20

Ex. 10MF J = 10 $\mu\text{F} \pm 5\%$

- Capacitance tolerance (for nominal capacitance lower than 10pF)

Symbol	B	C	D	F	G
Tolerance pF	± 0.1	± 0.25	± 0.5	± 1	± 2

Ex. 10PF G = 10pF $\pm 2\text{pF}$

3. Resistor (Res)

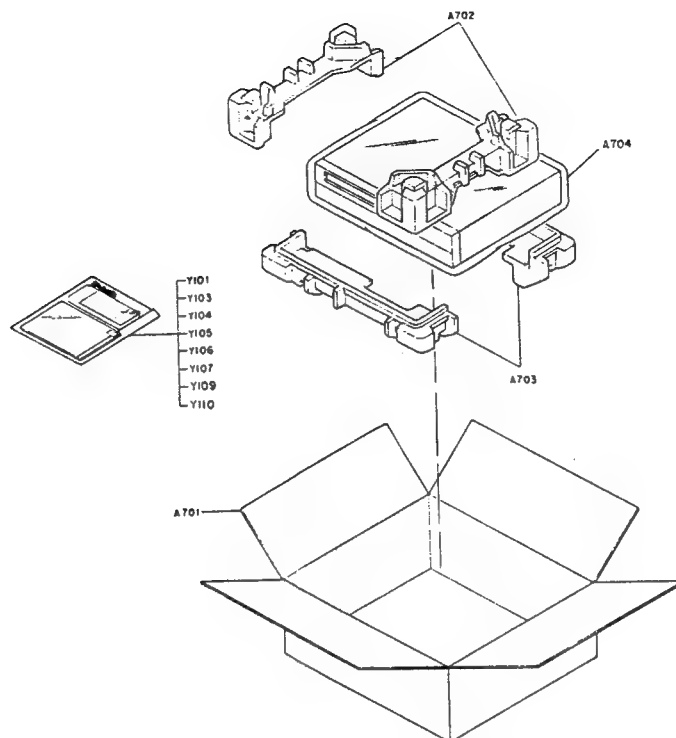
- Unit Ex.
No Mark Ω 10 10 Ω
K k Ω 10K 10k Ω
M M Ω 10M 10M Ω
W Watt 1W 1 Watt
- Resistance tolerance

Symbol	B	C	D	F	G	J	K	M
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10	± 20

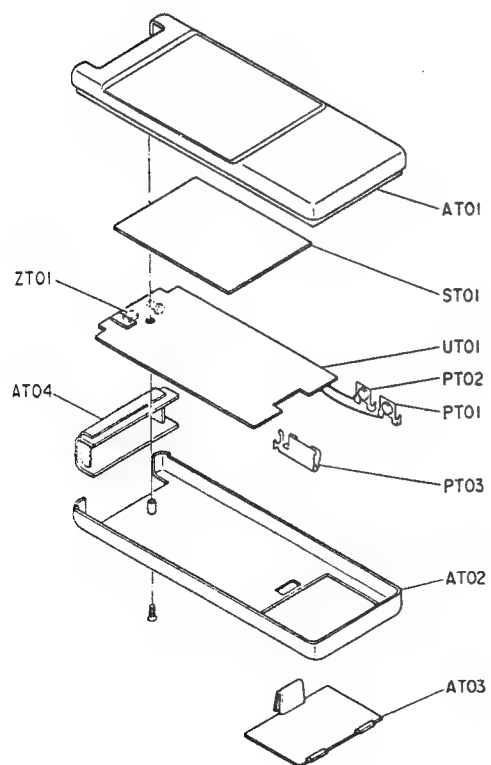
Ex. 470 J = 470 $\Omega \pm 5\%$

1. EXPLODED VIEWS

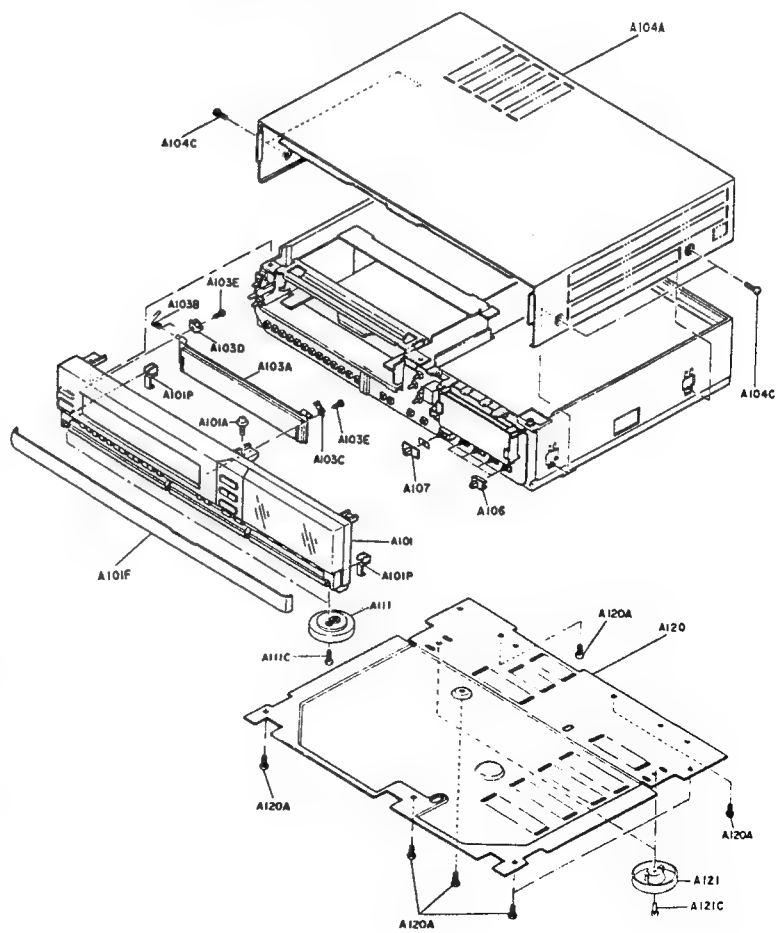
(1) Packing Assembly



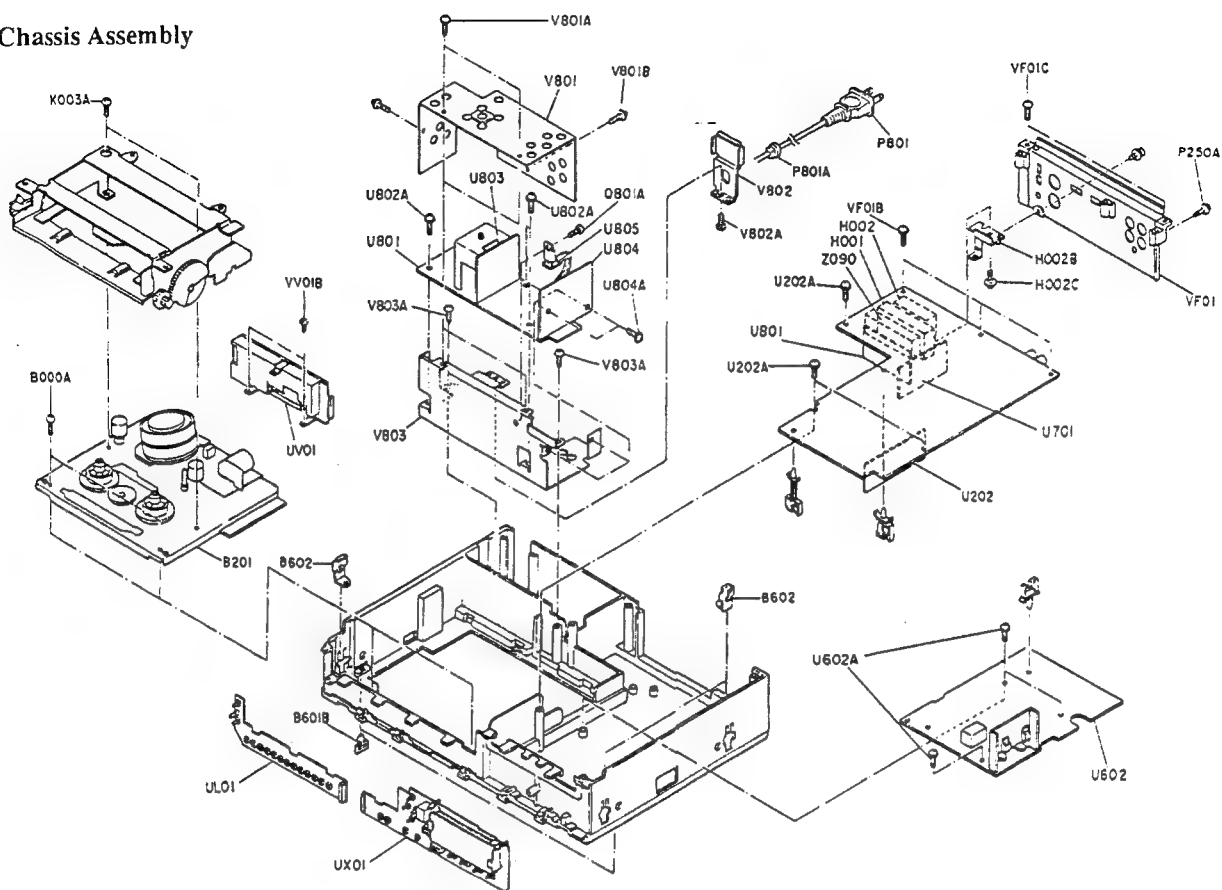
(2) Remote Control Unit



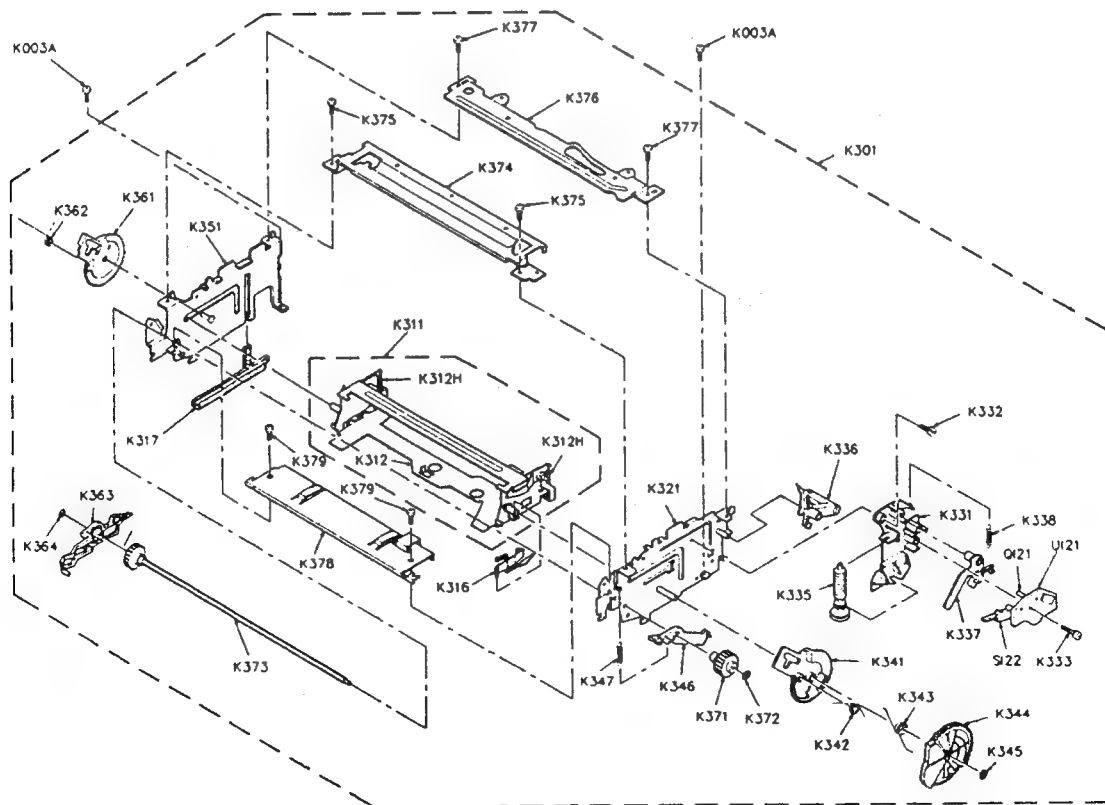
(3) Cabinet Assembly



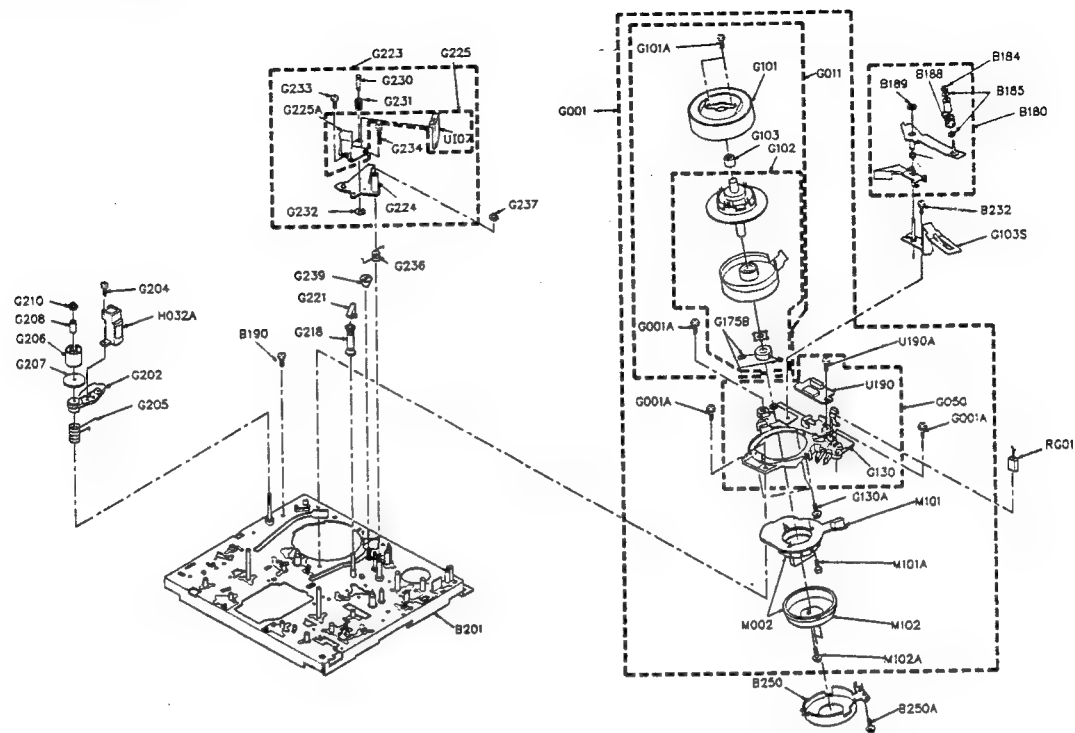
(4) Chassis Assembly



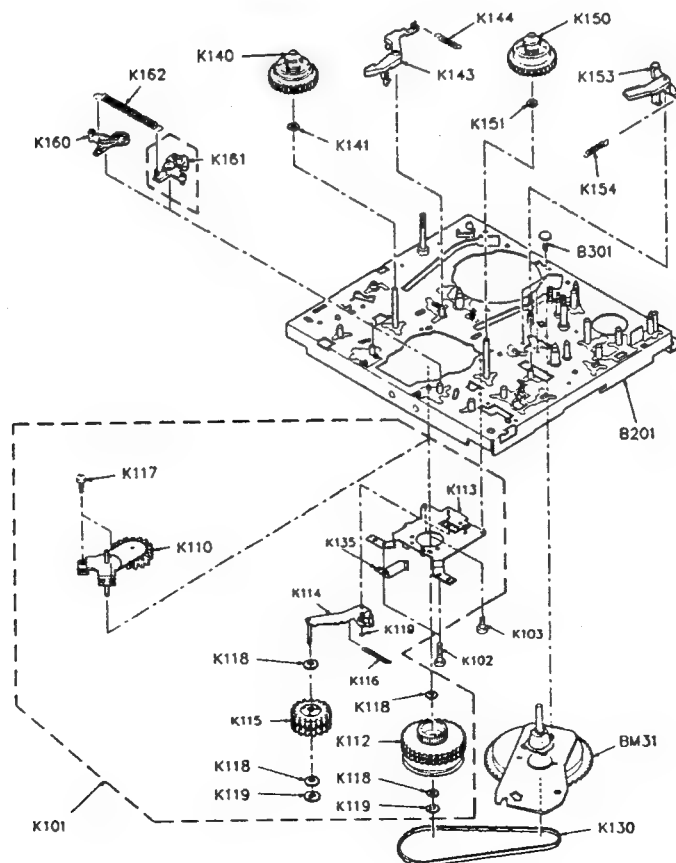
(5) Cassette Holder Assembly



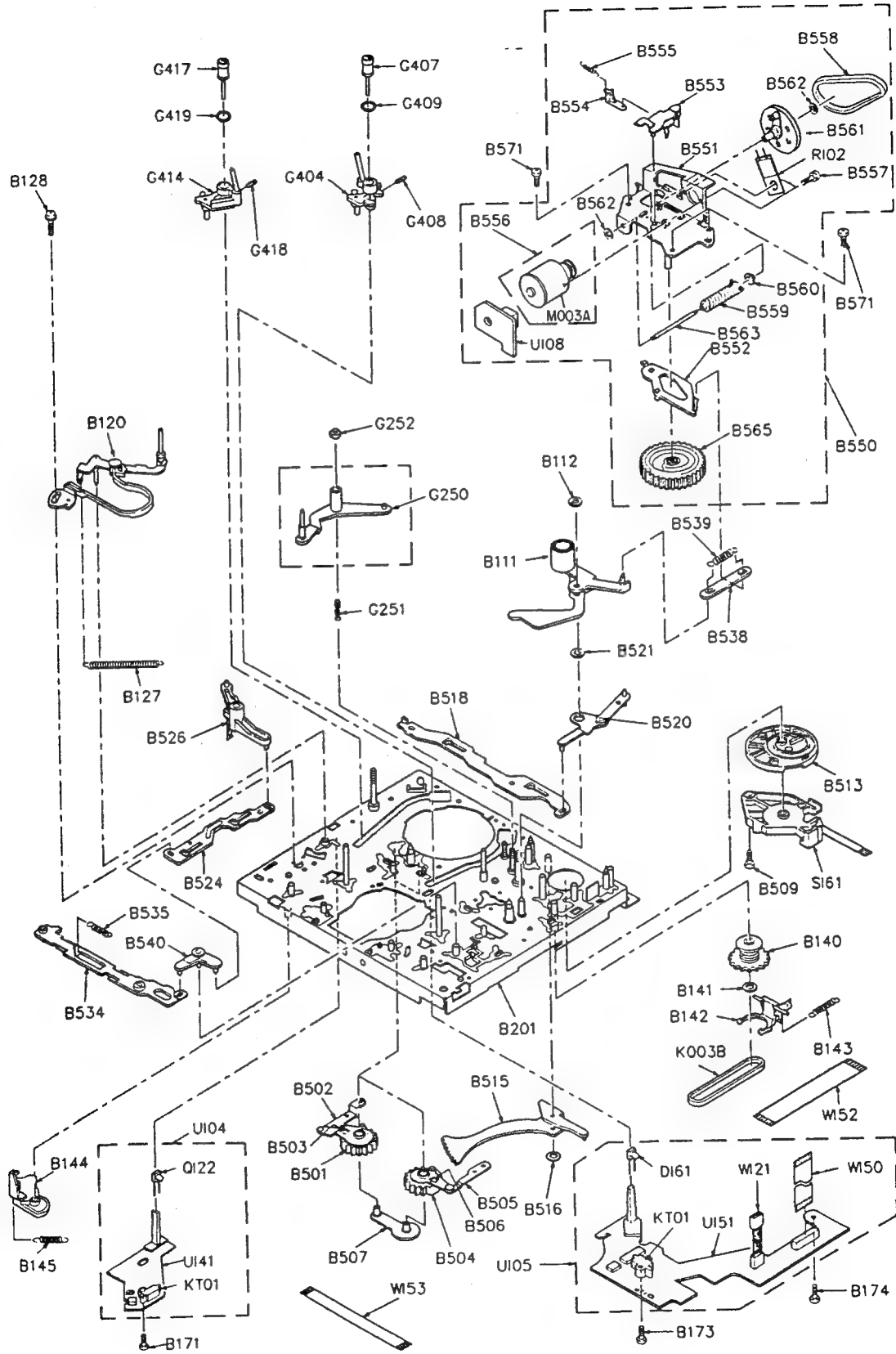
(6) Mechanical Parts (1)



(7) Mechanical Parts (2)



(8) Mechanical Parts (3)



2. PARTS LIST

LOCATION NUMBER	PART NUMBER	DESCRIPTION	LOCATION NUMBER	PART NUMBER	DESCRIPTION
- MECHANICAL PARTS -			B550	70312231	Loading Drive Assy
A101	70884272	Front Panel	B555	70351874	Spring
A101A	70391558	Screw	B556	70312232	Loading Motor Assy
A101F	70868594	Door	B557	23723304	Screw 3x4mm
A101P	70866631	Door Spring	B558	70342131	Belt
A103A	70868596	Cassette Door	B562	70396191	Washer FI 2.1x5x 0.5mm
A103B	70351857	Spring	B565	70333297	Cam Gear
A103C	70866646	Lock Plate	B571	70391334	Screw 3x8mm
A103D	70866647	Lock Plate	B601B	70862380	Rubber
A103E	70391443	Screw 2x6mm	BM31	70125291	Motor Assy
A104A	70824393	Top Cover	G001	70311522	Cylinder Assy
A104C	70391414	Screw 3x8mm	G001A	23723308	Screw 3x8mm
A106	70826460	Knob	G101	70325499	Upper Cylinder Assy
A107	70826461	Knob	G101A	70391398	Screw 2.6x8mm
A111	70843771	Insulator Assy	G102	70325500	Lower Cylinder Assy
A120	70815204	Bottom Cover	G103	70325494	Ground Cap Assy
A120A	70391356	Screw 3x10mm	G103S	70903456	Ground Brush KIT
A121	70843499	Insulator	G130A	70391409	Screw 2.6x8mm
A121C	70391440	Screw 3x10mm	G175B	23030107	Screw, 3x5mm
A701	70917779	Case	G202	70363423	Lever
A702	70921420	Packing(U)	G204	70391024	Screw 2.6x6mm
A703	70921421	Packing(L)	G205	70351877	Spring
A704	70933058	Cover	G206	70348229	Inpedance Roller
A708	70915052	Sheet	G207	70368208	Flange
AT01	70108686	Case	G208	70338172	Sleeve
AT02	70108520	Case(Lower)	G210	70393025	NUT 3x3mm
AT03	70108521	Case(Battery)	G218	70379067	Guide Sleeve
AT04	70108522	Filter	G221	70368198	NO.8 Guide Cap
B000A	70391081	Screw 4x12mm	G224	70328389	ACE Main Base Assy
B111	70323327	Pinch Assy	G225	70182063	ACE Head Sub Assy
B112	70396196	Washer FI 3.6x8x 0.5mm	G225A	70182097	ACE Sub Base
B120	70328360	Tension Regulator Assy	G230	70378601	Shaft
B127	70351944	Spring	G231	70351665	Spring
B128	23721310	Screw 3x10mm	G232	23002250	E-ring
B140	70328366	FL Drive Gear Assy	G233	23712308	Screw 3x0.5x8mm
B141	70396284	Washer 4.0x1.6x0.35mm	G234	70391322	Adjust Screw
B142	70363382	Lever	G236	70351878	Spring
B143	70351845	Spring	G237	70393026	Nut 3x4.5mm
B144	70363383	Lever	G239	70392018	Taper Nut
B145	70351846	Spring	G250	70320239	NO.9 Guide Lever Assy
B171	23712308	Screw 3x0.5x8mm	G251	70351842	Spring
B173	23712308	Screw 3x0.5x8mm	G252	70393025	NUT 3x3mm
B174	70391334	Screw 3x8mm	G404	70322434	Slider Assy
B180	70318715	Cleaner Assy	G407	70322438	Roller Assy
B184	70396284	Washer 4.0x1.6x0.35mm	G408	70391570	Screw 2x3mm
B185	70396048	Washer 3.9x2.1x0.25mm	G409	70353115	O-ring
B188	70353164	Cleaner	G414	70322437	Slider Assy
B189	70396284	Washer 4.0x1.6x0.35mm	G417	70322435	Roller Assy
B190	70391765	Screw	G418	70391570	Screw 2x3mm
B232	70391608	Screw 2.6x5mm	G419	70353115	O-ring
B250A	70391345	Screw 3x3mm	H001	70121106	Tuner EC432A
B301	70391578	Screw 2.6x6mm	H002	70123428	RF Modulator MM283
B501	70333298	Supply Loading Gear	H002B	70866644	Bracket
B502	70322431	Link Assy	H002C	23721305	Screw 3x5mm
B503	70351875	Spring	H032A	70183018	FE Head
B504	70333329	Take Up Loading Gear	K003A	23712308	Screw 3x0.5x8mm
B505	70322432	Link Assy	K003B	70342133	Belt
B506	70351876	Spring	K102	70391334	Screw 3x8mm
B507	70361335	Cap	K103	70391345	Screw 3x3mm
B509	70391334	Screw 3x8mm	K110	70326670	Idle Gear Assy
B513	70331164	Cam	K112	70326644	Clutch Assy
B515	70322430	Lever Assy	K114	70326646	Gear Lever Assy
B516	70396196	Washer FI 3.6x8x 0.5mm	K115	70326628	Direct Gear Assy
B518	70376400	Slider	K115A	70333302	Gear
B520	70323329	Lever Assy	K115B	70333301	Gear
B521	70347034	Polislider 4.1x 6.5x 0.50mm	K116	70351890	Spring
B524	70376407	Connector	K117	70391447	Screw 2.6x3mm
B526	70323340	Cam Lever Assy	K118	70396057	Washer 5.4x3.1x0.5mm
B534	70366017	Slider	K119	70396193	Washer FI 2.6x6x 0.5mm
B535	70351847	Spring	K119A	70396278	Washer 2.6x8x0.5
B538	70376408	Connector	K130	70342132	Belt
B539	70351873	Spring	K135	70373354	Bracket
B540	70363385	Lever	K140	70327115	S Reel Table Assy
			K141	70394200	Spacer
			K143	70363424	Lever

LOCATION NUMBER	PART NUMBER	DESCRIPTION
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LOCATION NUMBER	PART NUMBER	DESCRIPTION
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K144	70351892	Spring
K150	70327160	Take Up Reel Table Assy
K151	70394200	Spacer
K153	70326648	Reverse Brake Assy
K154	70351893	Spring
K160	70326649	Supply Brake Assy
K161	70326650	Take Up Brake Assy
K162	70351894	Spring
K301	70314306	Front Loading Assy
K312H	70351882	Spring
K316	70363392	Lever
K317	70366047	Slider
K331	70324409	Bracket
K332	23712308	Screw 3x0.5x8mm
K335	70324001	Front Loading Worm Assy
K335C	70338175	Spacer
K336	70363426	Opener
K337	70363439	Lever
K338	70351879	Spring
K341	70333331	Gear
K342	70351883	Spring
K343	70351884	Spring
K344	70333332	Gear
K345	70396195	Washer FI 3.6x6x 0.5mm
K346	70363425	Lever
K347	70351885	Spring
K361	70333334	Gear
K362	70351886	Spring
K363	70363416	Lever
K364	70396247	Washer 2.6x8.0x0.5mm
K371	70333333	Gear
K372	70396248	Washer 2.6x5.0x0.5mm
K373	70324425	Shaft Assy
K375	23712308	Screw 3x0.5x8mm
K377	23712308	Screw 3x0.5x8mm
K379	23774305	Screw 3X0.5X5mm
M002	70903457	Cylinder Motor
M003A	70125294	Motor
P101	23902596	Socket, 9P
P250A	70391440	Screw 3x10mm
△P801	23176869	Power Cord
△P801A	70846155	Cord Holder
Q810A	23721308	Screw 3x8mm
RG01	70213108	Dew Heater
RI02	70325243	Dew Sensor Assy
SI61	70145381	Cam Switch Assy
ST01	70108687	Rubber
U190A	70391434	Screw 2.6x6mm
U202A	72471082	Screw, 3x10mm
U602A	72471082	Screw, 3x10mm
U802A	72471081	Screw, 3x8mm
U804A	72471081	Screw, 3x8mm
V801A	72471081	Screw, 3x8mm
V801B	72471081	Screw, 3x8mm
V802A	70391355	Screw 3x8mm
V803A	70391081	Screw 4x12mm
V803B	70391080	Screw 4x10mm
VF01B	72471082	Screw, 3x10mm
VF01C	72471082	Screw, 3x10mm
VF01D	23721305	Screw 3x5mm
VV01B	70391434	Screw 2.6x6mm
W601	70179893	Wire
W152	70179391	Wire, FFC
W153	70178108	Wire FFC, 6P
Y101	70971481	Owners Manual, E/A
Y103	70060070	Caution Sheet
Y104	70933070	Cover
Y105	23364494	ANT Cable, PAL
Y106	70148427	Remote Control Unit
Y109	23122780	AC Adaptor
Y110	23365255	ANT Adaptor
ZT01	23153736	Resonator, CSB455EB20

LOCATION NUMBER	PART NUMBER	DESCRIPTION		LOCATION NUMBER	PART NUMBER	DESCRIPTION	
- ELECTRICAL PARTS -							
U202	70188776	P C Board Assy	Main	Q233	A6332430	Transistor	2SC2458-Y
- INTEGRATED CIRCUITS -							
IC201	B0384210	IC	TA8802N	Q234	A6332430	Transistor	2SC2458-Y
IC202	B0589735	IC	TL8809P	Q235	A6002040	Transistor	RN1204
IC203	B0589111	IC	TL8811P	Q236	A6332430	Transistor	2SC2458-Y
IC204	23319003	IC	LVA523S	Q237	A6002040	Transistor	RN1204
IC301	70119487	IC	BA7025L	Q238	A6002040	Transistor	RN1204
IC302	70119487	IC	BA7025L	Q239	A6534053	Transistor	2SA1015-Y
IC401	70128501	IC	M52063SP	Q240	A6332430	Transistor	2SC2458-Y
IC402	70128382	IC	NJM2234S	Q241	A6534430	Transistor	2SA1048-Y
IC403	70128382	IC	NJM2234S	Q242	A6002040	Transistor	RN1204
Z090	70137237	F.U.	STD-MS1	Q243	A6332430	Transistor	2SC2458-Y
Z481	70137214	F.U. SECAM	HSC-103	Q244	A6002040	Transistor	RN1204
- TRANSISTORS -							
Q071	A6002020	Transistor	RN1202	Q245	A6002020	Transistor	RN1202
Q072	A6041857	Transistor	2SK117-Y	Q246	A6332430	Transistor	2SC2458-Y
Q073	A6534430	Transistor	2SA1048-Y	Q247	A6002040	Transistor	RN1204
Q074	A6332430	Transistor	2SC2458-Y	Q248	A6002040	Transistor	RN1204
Q076	A6012010	Transistor	RN2201	Q249	A6002040	Transistor	RN1204
Q077	A6002050	Transistor	RN1205	Q261	A6332430	Transistor	2SC2458-Y
Q078	A6012060	Transistor	RN2206	Q303	A6002040	Transistor	RN1204
Q079	A6002050	Transistor	RN1205	Q304	A6002040	Transistor	RN1204
Q080	A6012060	Transistor	RN2206	Q305	A6002040	Transistor	RN1204
Q081	A6012050	Transistor	RN2205	Q411	A6332430	Transistor	2SC2458-Y
Q082	A6332430	Transistor	2SC2458-Y	Q412	A6534430	Transistor	2SA1048-Y
Q083	A6012050	Transistor	RN2205	Q413	A6332430	Transistor	2SC2458-Y
Q085	A6332430	Transistor	2SC2458-Y	Q414	A6332430	Transistor	2SC2458-Y
Q091	A6332430	Transistor	2SC2458-Y	Q415	A6332430	Transistor	2SC2458-Y
Q101	A6002040	Transistor	RN1204	Q416	A6332430	Transistor	2SC2458-Y
Q102	A6002040	Transistor	RN1204	Q417	A6534430	Transistor	2SA1048-Y
Q103	A6002040	Transistor	RN1204	Q418	A6012020	Transistor	RN2202
Q104	A6002040	Transistor	RN1204	Q419	A6012020	Transistor	RN2202
Q106	A6332430	Transistor	2SC2458-Y	Q420	A6332430	Transistor	2SC2458-Y
Q107	A6534430	Transistor	2SA1048-Y	Q421	A6332430	Transistor	2SC2458-Y
Q108	A6332430	Transistor	2SC2458-Y	Q422	A6332430	Transistor	2SC2458-Y
Q109	A6534430	Transistor	2SA1048-Y	Q423	A6332430	Transistor	2SC2458-Y
Q110	A6332430	Transistor	2SC2458-Y	Q424	A6332430	Transistor	2SC2458-Y
Q111	A6332430	Transistor	2SC2458-Y	Q425	A6002020	Transistor	RN1202
Q112	A6012020	Transistor	RN2202	Q426	A6332430	Transistor	2SC2458-Y
Q113	A6332430	Transistor	2SC2458-Y	Q481	A6325549	Transistor	2SC2236-Y
Q114	A6002040	Transistor	RN1204	Q482	A6332430	Transistor	2SC2458-Y
Q115	A6002040	Transistor	RN1204	Q731	A6002030	Transistor	RN1203
Q116	A6332430	Transistor	2SC2458-Y	Q732	A6002020	Transistor	RN1202
Q181	A6534430	Transistor	2SA1048-Y	- DIODES -			
Q182	A6332430	Transistor	2SC2458-Y	D001	A7151500	Diode	1SS201
Q183	A6332430	Transistor	2SC2458-Y	D002	A7160570	Diode	1SS176
Q184	A6002040	Transistor	RN1204	D003	23115922	Diode, Zener	UPC574J
Q185	A6534430	Transistor	2SA1048-Y	D202	A7160570	Diode	1SS176
Q186	A6002040	Transistor	RN1204	D203	A7160570	Diode	1SS176
Q187	A6534430	Transistor	2SA1048-Y	D204	A7160570	Diode	1SS176
Q212	A6002040	Transistor	RN1204	D205	A7160570	Diode	1SS176
Q213	A6534430	Transistor	2SA1048-Y	D206	A7160570	Diode	1SS176
Q214	A6002010	Transistor	RN1201	D207	A7160570	Diode	1SS176
Q215	A6002010	Transistor	RN1201	D209	A7160570	Diode	1SS176
Q216	A6002040	Transistor	RN1204	D210	A7160570	Diode	1SS176
Q217	A6332430	Transistor	2SC2458-Y	D212	A7160570	Diode	1SS176
Q218	A6332430	Transistor	2SC2458-Y	D213	A7160570	Diode	1SS176
Q219	A6002040	Transistor	RN1204	D215	A7160570	Diode	1SS176
Q220	A6002040	Transistor	RN1204	D216	A7160570	Diode	1SS176
Q221	A6002010	Transistor	RN1201	D218	A7160570	Diode	1SS176
Q222	A6002040	Transistor	RN1204	D301	A7151500	Diode	1SS201
Q223	A6002040	Transistor	RN1204	D302	A7160570	Diode	1SS176
Q224	A6002040	Transistor	RN1204	D303	A7160570	Diode	1SS176
Q225	A6534430	Transistor	2SA1048-Y	D306	A7160570	Diode	1SS176
Q226	A6534430	Transistor	2SA1048-Y	D307	A7160570	Diode	1SS176
Q227	A6332430	Transistor	2SC2458-Y	D401	A7160570	Diode	1SS176
Q228	A6332430	Transistor	2SC2458-Y	D402	A7160570	Diode	1SS176
Q229	A6332430	Transistor	2SC2458-Y	D403	A7160570	Diode	1SS176
Q230	A6534430	Transistor	2SA1048-Y	D404	A7160570	Diode	1SS176
Q231	A6332430	Transistor	2SC2458-Y	D405	A7160570	Diode	1SS176
Q232	A6534430	Transistor	2SA1048-Y	D731	A7160570	Diode	1SS176
- COILS -							
				D732	A7160570	Diode	1SS176
				L001	23238710	Coil, Peaking	TRF4220AJ
				L002	23238720	Coil, Peaking	TRF4339AJ
				L003	23238710	Coil, Peaking	TRF4220AJ
				L101	23289181	Coil, Peaking	TRF4181AF

LOCATION PART
NUMBER NUMBER DESCRIPTION

L102 23238706 Coil, Peaking TRF4470AJ
L104 23237935 Coil, Peaking TRF4200AC
L105 23238706 Coil, Peaking TRF4470AJ
L106 23238710 Coil, Peaking TRF4220AJ
L107 23238710 Coil, Peaking TRF4220AJ
L108 23289471 Coil, Peaking TRF4471AF
L109 23289221 Coil, Peaking TRF4221AF
L110 23237970 Coil, Peaking TRF4271AC
L181 23238709 Coil, Peaking TRF4270AJ
L201 23238710 Coil, Peaking TRF4220AJ
L202 23289101 Coil, Peaking TRF4101AF
L203 23289470 Coil, Peaking TRF4470AF
L204 23238910 Coil, Peaking TRF4101AC
L205 23238910 Coil, Peaking TRF4101AC
L206 23238708 Coil, Peaking TRF4330AJ
L207 23238710 Coil, Peaking TRF4220AJ
L209 23237951 Coil, Peaking TRF4439AC
L210 23238704 Coil, Peaking TRF4680AJ
L211 23289331 Coil, Peaking TRF4331AF
L213 23238710 Coil, Peaking TRF4220AJ
L351 70272005 Coil, Variable LAA02
L352 70272005 Coil, Variable LAA02
L401 23289150 Coil, Peaking TRF4150AF
L403 23238708 Coil, Peaking TRF4330AJ
L404 23238910 Coil, Peaking TRF4101AC

- CAPACITORS -

C071 24474103 Cap, Ceramic 0.01MF N 16V
C072 24203101 Cap, Electrolytic 100MF M 16V
C073 24474103 Cap, Ceramic 0.01MF N 16V
C074 24203101 Cap, Electrolytic 100MF M 16V
C075 24474103 Cap, Ceramic 0.01MF N 16V
C076 24206478 Cap, Electrolytic 0.47MF M 50V
C077 24591104 Cap, Plastic 0.1MF J 50V
C078 24203220 Cap, Electrolytic 22MF M 16V
C079 24203100 Cap, Electrolytic 10MF M 16V
C080 24474391 Cap, Ceramic 390PF K 50V
C081 24474151 Cap, Ceramic 150PF K 50V
C082 24591124 Cap, Plastic 0.12MF J 50V
C083 24591104 Cap, Plastic 0.1MF J 50V
C084 24591683 Cap, Plastic 0.068MF J 50V
C085 24797101 Cap, Electrolytic 100MF M 50V
C086 24206229 Cap, Electrolytic 2.2MF M 50V
C087 24206229 Cap, Electrolytic 2.2MF M 50V
C088 24474103 Cap, Ceramic 0.01MF N 16V
C101 24201470 Cap, Electrolytic 47MF M 6.3V
C102 24474103 Cap, Ceramic 0.01MF N 16V
C103 24436121 Cap, Ceramic 120PF J 50V
C104 24474103 Cap, Ceramic 0.01MF N 16V
C105 24473330 Cap, Ceramic 33PF J 50V
C106 24473270 Cap, Ceramic 27PF J 50V
C107 24473470 Cap, Ceramic 47PF J 50V
C108 24473150 Cap, Ceramic 15PF J 50V
C109 24473270 Cap, Ceramic 27PF J 50V
C110 24473120 Cap, Ceramic 12PF J 50V
C111 24473270 Cap, Ceramic 27PF J 50V
C113 24473470 Cap, Ceramic 47PF J 50V
C114 24474103 Cap, Ceramic 0.01MF N 16V
C115 24474103 Cap, Ceramic 0.01MF N 16V
C116 24474103 Cap, Ceramic 0.01MF N 16V
C117 24201470 Cap, Electrolytic 47MF M 6.3V
C118 24538334 Cap, Plastic 0.33MF J 50V
C119 24436471 Cap, Ceramic 470PF J 50V
C120 24436820 Cap, Ceramic 82PF J 50V
C121 24436221 Cap, Ceramic 220PF J 50V
C122 24474103 Cap, Ceramic 0.01MF N 16V
C124 24436201 Cap, Ceramic 200PF J 50V
C125 24538104 Cap, Plastic 0.1MF J 50V
C126 24473569 Cap, Ceramic 5.6PF K 50V
C181 24436820 Cap, Ceramic 82PF J 50V
C182 24474103 Cap, Ceramic 0.01MF N 16V
C183 24794470 Cap, Electrolytic 47MF M 16V
C184 24474103 Cap, Ceramic 0.01MF N 16V
C185 24474103 Cap, Ceramic 0.01MF N 16V
C186 24794470 Cap, Electrolytic 47MF M 16V
C201 24203100 Cap, Electrolytic 10MF M 16V

LOCATION PART
NUMBER NUMBER DESCRIPTION

C202 24203100 Cap, Electrolytic 10MF M 16V
C203 24085970 Cap, Electrolytic 10MF M 16V
C204 24436201 Cap, Ceramic 200PF J 50V
C205 24232223 Cap, Ceramic 0.022MF Z 50V
C206 24206010 Cap, Electrolytic 1MF M 50V
C207 24206010 Cap, Electrolytic 1MF M 50V
C208 24201470 Cap, Electrolytic 47MF M 6.3V
C209 24538473 Cap, Plastic 0.047MF J 50V
C210 24436910 Cap, Ceramic 91PF J 50V
C211 24474103 Cap, Ceramic 0.01MF N 16V
C212 24205479 Cap, Electrolytic 4.7MF M 35V
C213 24538183 Cap, Plastic 0.018MF J 50V
C214 24206339 Cap, Electrolytic 3.3MF M 50V
C215 24591222 Cap, Plastic 2200PF J 50V
C216 24206010 Cap, Electrolytic 1MF M 50V
C217 24436151 Cap, Ceramic 150PF J 50V
C218 24474103 Cap, Ceramic 0.01MF N 16V
C219 24474103 Cap, Ceramic 0.01MF N 16V
C220 24474103 Cap, Ceramic 0.01MF N 16V
C221 24353470 Cap, Ceramic 47PF J 50V
C222 24472100 Cap, Ceramic 10PF J 50V
C223 24472100 Cap, Ceramic 10PF J 50V
C224 24353470 Cap, Ceramic 47PF J 50V
C225 24206010 Cap, Electrolytic 1MF M 50V
C226 24201470 Cap, Electrolytic 47MF M 6.3V
C227 24538473 Cap, Plastic 0.047MF J 50V
C228 24474103 Cap, Ceramic 0.01MF N 16V
C229 24206010 Cap, Electrolytic 1MF M 50V
C230 24473560 Cap, Ceramic 56PF J 50V
C231 24538563 Cap, Plastic 0.056MF J 50V
C232 24474103 Cap, Ceramic 0.01MF N 16V
C233 24538153 Cap, Plastic 0.015MF J 50V
C234 24232223 Cap, Ceramic 0.022MF Z 50V
C235 24474103 Cap, Ceramic 0.01MF N 16V
C236 24851104 Cap, Ceramic 0.1MF K 25V
C237 24474103 Cap, Ceramic 0.01MF N 16V
C238 24201220 Cap, Electrolytic 22MF M 6.3V
C239 24436151 Cap, Ceramic 150PF J 50V
C240 24206108 Cap, Electrolytic 0.1MF M 50V
C241 24201470 Cap, Electrolytic 47MF M 6.3V
C242 24201470 Cap, Electrolytic 47MF M 6.3V
C243 24473180 Cap, Ceramic 18PF J 50V
C244 24436820 Cap, Ceramic 82PF J 50V
C245 24474103 Cap, Ceramic 0.01MF N 16V
C246 24201470 Cap, Electrolytic 47MF M 6.3V
C247 24206010 Cap, Electrolytic 1MF M 50V
C248 24474103 Cap, Ceramic 0.01MF N 16V
C249 24206229 Cap, Electrolytic 2.2MF M 50V
C251 24093962 Cap, Variable 20PF
C252 24093962 Cap, Variable 20PF
C261 24206010 Cap, Electrolytic 1MF M 50V
C262 24474103 Cap, Ceramic 0.01MF N 16V
C264 24353121 Cap, Ceramic 120PF J 50V
C265 24353121 Cap, Ceramic 120PF J 50V
C266 24353220 Cap, Ceramic 22PF J 50V
C267 24353820 Cap, Ceramic 82PF J 50V
C268 24353330 Cap, Ceramic 33PF J 50V
C269 24474103 Cap, Ceramic 0.01MF N 16V
C270 24206010 Cap, Electrolytic 1MF M 50V
C271 24474103 Cap, Ceramic 0.01MF N 16V
C272 24206010 Cap, Electrolytic 1MF M 50V
C273 24201470 Cap, Electrolytic 47MF M 6.3V
C274 24474103 Cap, Ceramic 0.01MF N 16V
C275 24206478 Cap, Electrolytic 0.47MF M 50V
C276 24473829 Cap, Ceramic 8.2PF K 50V
C277 24473829 Cap, Ceramic 8.2PF K 50V
C278 24794470 Cap, Electrolytic 47MF M 16V
C279 24793221 Cap, Electrolytic 220MF M 10V
C280 24473100 Cap, Ceramic 10PF J 50V
C281 24473330 Cap, Ceramic 33PF J 50V
C282 24473100 Cap, Ceramic 10PF J 50V
C283 24206010 Cap, Electrolytic 1MF M 50V
C284 24203100 Cap, Electrolytic 10MF M 16V
C285 24474103 Cap, Ceramic 0.01MF N 16V
C286 24474103 Cap, Ceramic 0.01MF N 16V

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C287	24794470	Cap, Electrolytic 47MF M 16V
C288	24474103	Cap, Ceramic 0.01MF N 16V
C289	24794470	Cap, Electrolytic 47MF M 16V
C290	24436181	Cap, Ceramic 180PF J 50V
C291	24793101	Cap, Electrolytic 100MF M 10V
C292	24793471	Cap, Electrolytic 470MF M 10V
C293	24851104	Cap, Ceramic 0.1MF K 25V
C294	24436820	Cap, Ceramic 82PF J 50V
C295	24473510	Cap, Ceramic 51PF J 50V
C296	24436121	Cap, Ceramic 120PF J 50V
C297	24436201	Cap, Ceramic 200PF J 50V
C298	24205479	Cap, Electrolytic 4.7MF M 35V
C301	24474102	Cap, Ceramic 1000PF K 50V
C302	24538223	Cap, Plastic 0.022MF J 50V
C303	24201470	Cap, Electrolytic 47MF M 6.3V
C304	24206478	Cap, Electrolytic 0.47MF M 50V
C305	24201220	Cap, Electrolytic 22MF M 6.3V
C306	24474102	Cap, Ceramic 1000PF K 50V
C307	24474102	Cap, Ceramic 1000PF K 50V
C308	24538223	Cap, Plastic 0.022MF J 50V
C309	24201470	Cap, Electrolytic 47MF M 6.3V
C310	24206478	Cap, Electrolytic 0.47MF M 50V
C311	24474102	Cap, Ceramic 1000PF K 50V
C312	24203100	Cap, Electrolytic 10MF M 16V
C313	24202330	Cap, Electrolytic 33MF M 10V
C314	24202330	Cap, Electrolytic 33MF M 10V
C315	24473560	Cap, Ceramic 56PF J 50V
C316	24085988	Cap, Electrolytic 1MF M 50V
C317	24473390	Cap, Ceramic 39PF J 50V
C381	24474103	Cap, Ceramic 0.01MF N 16V
C382	24201470	Cap, Electrolytic 47MF M 6.3V
C401	24591332	Cap, Plastic 3300PF J 50V
C402	24591332	Cap, Plastic 3300PF J 50V
C403	24206010	Cap, Electrolytic 1MF M 50V
C404	24538103	Cap, Plastic 0.01MF J 50V
C405	24436821	Cap, Ceramic 820PF J 50V
C406	24474103	Cap, Ceramic 0.01MF N 16V
C407	24201470	Cap, Electrolytic 47MF M 6.3V
C408	24474103	Cap, Ceramic 0.01MF N 16V
C409	24436820	Cap, Ceramic 82PF J 50V
C410	24474103	Cap, Ceramic 0.01MF N 16V
C411	24473560	Cap, Ceramic 56PF J 50V
C412	24473560	Cap, Ceramic 56PF J 50V
C413	24474103	Cap, Ceramic 0.01MF N 16V
C414	24474103	Cap, Ceramic 0.01MF N 16V
C415	24474103	Cap, Ceramic 0.01MF N 16V
C416	24474103	Cap, Ceramic 0.01MF N 16V
C417	24474103	Cap, Ceramic 0.01MF N 16V
C418	24474103	Cap, Ceramic 0.01MF N 16V
C419	24474103	Cap, Ceramic 0.01MF N 16V
C420	24474103	Cap, Ceramic 0.01MF N 16V
C421	24474103	Cap, Ceramic 0.01MF N 16V
C422	24474103	Cap, Ceramic 0.01MF N 16V
C423	24474103	Cap, Ceramic 0.01MF N 16V
C424	24474103	Cap, Ceramic 0.01MF N 16V
C425	24474103	Cap, Ceramic 0.01MF N 16V
C426	24474103	Cap, Ceramic 0.01MF N 16V
C427	24474103	Cap, Ceramic 0.01MF N 16V
C428	24474103	Cap, Ceramic 0.01MF N 16V
C429	24474103	Cap, Ceramic 0.01MF N 16V
C430	24473470	Cap, Ceramic 47PF J 50V
C431	24474103	Cap, Ceramic 0.01MF N 16V
C432	24474103	Cap, Ceramic 0.01MF N 16V
C433	24203100	Cap, Electrolytic 10MF M 16V
C434	24474103	Cap, Ceramic 0.01MF N 16V
C435	24201470	Cap, Electrolytic 47MF M 6.3V
C436	24474103	Cap, Ceramic 0.01MF N 16V
C437	24474103	Cap, Ceramic 0.01MF N 16V
C438	24201470	Cap, Electrolytic 47MF M 6.3V
C439	24474103	Cap, Ceramic 0.01MF N 16V
C440	24474103	Cap, Ceramic 0.01MF N 16V
C441	24474103	Cap, Ceramic 0.01MF N 16V
C443	24473220	Cap, Ceramic 22PF J 50V
C444	24474103	Cap, Ceramic 0.01MF N 16V
C445	24474103	Cap, Ceramic 0.01MF N 16V

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C481	24794470	Cap, Electrolytic 47MF M 16V
C730	24206010	Cap, Electrolytic 1MF M 50V
C731	24591822	Cap, Plastic 8200PF J 50V
C732	24591183	Cap, Plastic 0.018MF J 50V
- RESISTORS -		
R071	24366104	Res, Carbon 100K J 1/6W
R072	24366122	Res, Carbon 1.2K J 1/6W
R073	24366105	Res, Carbon 1M J 1/6W
R074	24366224	Res, Carbon 220K J 1/6W
R075	24366244	Res, Carbon 240K J 1/6W
R076	24366224	Res, Carbon 220K J 1/6W
R077	24366474	Res, Carbon 470K J 1/6W
R078	24366334	Res, Carbon 330K J 1/6W
R079	24366105	Res, Carbon 1M J 1/6W
R080	24366272	Res, Carbon 2.7K J 1/6W
R081	24366303	Res, Carbon 30K J 1/6W
R082	24366103	Res, Carbon 10K J 1/6W
R083	24366223	Res, Carbon 22K J 1/6W
R084	24366153	Res, Carbon 15K J 1/6W
R085	24366183	Res, Carbon 18K J 1/6W
R086	24366273	Res, Carbon 27K J 1/6W
R087	24366102	Res, Carbon 1K J 1/6W
R090	24366102	Res, Carbon 1K J 1/6W
R091	24366102	Res, Carbon 1K J 1/6W
R092	24366162	Res, Carbon 1.6K J 1/6W
R093	24366472	Res, Carbon 4.7K J 1/6W
R094	24366102	Res, Carbon 1K J 1/6W
R101	24366473	Res, Carbon 47K J 1/6W
R102	24366472	Res, Carbon 4.7K J 1/6W
R103	24366472	Res, Carbon 4.7K J 1/6W
R104	24366333	Res, Carbon 33K J 1/6W
R105	24366122	Res, Carbon 1.2K J 1/6W
R106	24366333	Res, Carbon 33K J 1/6W
R107	24366333	Res, Carbon 33K J 1/6W
R108	24366102	Res, Carbon 1K J 1/6W
R109	24366821	Res, Carbon 820 J 1/6W
R110	24366331	Res, Carbon 330 J 1/6W
R111	24366102	Res, Carbon 1K J 1/6W
R112	24366332	Res, Carbon 3.3K J 1/6W
R113	24366561	Res, Carbon 560 J 1/6W
R114	24366821	Res, Carbon 820 J 1/6W
R115	24366152	Res, Carbon 1.5K J 1/6W
R116	24366102	Res, Carbon 1K J 1/6W
R117	24366102	Res, Carbon 1K J 1/6W
R118	24366222	Res, Carbon 2.2K J 1/6W
R119	24366561	Res, Carbon 560 J 1/6W
R120	24366101	Res, Carbon 100 J 1/6W
R121	24366102	Res, Carbon 1K J 1/6W
R122	24366101	Res, Carbon 100 J 1/6W
R123	24366333	Res, Carbon 33K J 1/6W
R124	24366123	Res, Carbon 12K J 1/6W
R125	24366241	Res, Carbon 240 J 1/6W
R126	24366182	Res, Carbon 1.8K J 1/6W
R127	24366222	Res, Carbon 2.2K J 1/6W
R128	24366182	Res, Carbon 1.8K J 1/6W
R129	24366303	Res, Carbon 30K J 1/6W
R130	24366103	Res, Carbon 10K J 1/6W
R131	24366302	Res, Carbon 3K J 1/6W
R132	24366681	Res, Carbon 680 J 1/6W
R133	24366471	Res, Carbon 470 J 1/6W
R134	24366432	Res, Carbon 4.3K J 1/6W
R135	24366102	Res, Carbon 1K J 1/6W
R136	24366563	Res, Carbon 56K J 1/6W
R158	24066954	Res, Variable 2K
R181	24366102	Res, Carbon 1K J 1/6W
R182	24366102	Res, Carbon 1K J 1/6W
R183	24366562	Res, Carbon 5.6K J 1/6W
R184	24366102	Res, Carbon 1K J 1/6W
R185	24366681	Res, Carbon 680 J 1/6W
R186	24366152	Res, Carbon 1.5K J 1/6W
R187	24366681	Res, Carbon 680 J 1/6W
R188	24366223	Res, Carbon 22K J 1/6W
R189	24366103	Res, Carbon 10K J 1/6W
R190	24366122	Res, Carbon 1.2K J 1/6W
R191	24366272	Res, Carbon 2.7K J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R192	24366102	Res, Carbon	1K	J 1/6W
R193	24366122	Res, Carbon	1.2K	J 1/6W
R201	24366224	Res, Carbon	220K	J 1/6W
R203	24366512	Res, Carbon	5.1K	J 1/6W
R204	24366472	Res, Carbon	4.7K	J 1/6W
R205	24366102	Res, Carbon	1K	J 1/6W
R206	24366203	Res, Carbon	20K	J 1/6W
R208	24366224	Res, Carbon	220K	J 1/6W
R210	24366152	Res, Carbon	1.5K	J 1/6W
R211	24366391	Res, Carbon	390	J 1/6W
R214	24366103	Res, Carbon	10K	J 1/6W
R215	24366243	Res, Carbon	24K	J 1/6W
R217	24366681	Res, Carbon	680	J 1/6W
R218	24366102	Res, Carbon	1K	J 1/6W
R219	24366102	Res, Carbon	1K	J 1/6W
R221	24366471	Res, Carbon	470	J 1/6W
R222	24366123	Res, Carbon	12K	J 1/6W
R223	24366822	Res, Carbon	8.2K	J 1/6W
R224	24366103	Res, Carbon	10K	J 1/6W
R225	24366221	Res, Carbon	220	J 1/6W
R226	24366102	Res, Carbon	1K	J 1/6W
R227	24366472	Res, Carbon	4.7K	J 1/6W
R228	24366183	Res, Carbon	18K	J 1/6W
R229	24366102	Res, Carbon	1K	J 1/6W
R230	24366102	Res, Carbon	1K	J 1/6W
R231	24366472	Res, Carbon	4.7K	J 1/6W
R232	24366102	Res, Carbon	1K	J 1/6W
R233	24366103	Res, Carbon	10K	J 1/6W
R234	24366223	Res, Carbon	22K	J 1/6W
R235	24366474	Res, Carbon	470K	J 1/6W
R236	24366102	Res, Carbon	1K	J 1/6W
R237	24366393	Res, Carbon	39K	J 1/6W
R238	24366683	Res, Carbon	68K	J 1/6W
R239	24366564	Res, Carbon	560K	J 1/6W
R240	24366103	Res, Carbon	10K	J 1/6W
R241	24366103	Res, Carbon	10K	J 1/6W
R242	24366103	Res, Carbon	10K	J 1/6W
R243	24366203	Res, Carbon	20K	J 1/6W
R244	24366122	Res, Carbon	1.2K	J 1/6W
R245	24366821	Res, Carbon	820	J 1/6W
R246	24366751	Res, Carbon	750	J 1/6W
R247	24366222	Res, Carbon	2.2K	J 1/6W
R248	24000952	Res, Thermistor	3K	
R249	24366751	Res, Carbon	750	J 1/6W
R251	24066951	Res, Variable	20K	
R252	24066951	Res, Variable	20K	
R255	24066952	Res, Variable	10K	
R256	24066952	Res, Variable	10K	
R257	24066954	Res, Variable	2K	
R259	24066953	Res, Variable	5K	
R261	24366102	Res, Carbon	1K	J 1/6W
R262	24366471	Res, Carbon	470	J 1/6W
R263	24366680	Res, Carbon	68	J 1/6W
R264	24366103	Res, Carbon	10K	J 1/6W
R265	24366332	Res, Carbon	3.3K	J 1/6W
R266	24366222	Res, Carbon	2.2K	J 1/6W
R267	24366103	Res, Carbon	10K	J 1/6W
R269	24366102	Res, Carbon	1K	J 1/6W
R270	24366511	Res, Carbon	510	J 1/6W
R271	24366272	Res, Carbon	2.7K	J 1/6W
R272	24366101	Res, Carbon	100	J 1/6W
R273	24366102	Res, Carbon	1K	J 1/6W
R274	24366751	Res, Carbon	750	J 1/6W
R276	24000952	Res, Thermistor	3K	
R277	24366103	Res, Carbon	10K	J 1/6W
R278	24366473	Res, Carbon	47K	J 1/6W
R279	24366471	Res, Carbon	470	J 1/6W
R280	24366122	Res, Carbon	1.2K	J 1/6W
R281	24366152	Res, Carbon	1.5K	J 1/6W
R283	24366222	Res, Carbon	2.2K	J 1/6W
R284	24366332	Res, Carbon	3.3K	J 1/6W
R285	24366103	Res, Carbon	10K	J 1/6W
R286	24366105	Res, Carbon	1M	J 1/6W
R287	24366183	Res, Carbon	18K	J 1/6W
R288	24366103	Res, Carbon	10K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R289	24366332	Res, Carbon	3.3K	J 1/6W
R290	24366331	Res, Carbon	330	J 1/6W
R291	24366331	Res, Carbon	330	J 1/6W
R292	24366391	Res, Carbon	390	J 1/6W
R293	24366561	Res, Carbon	560	J 1/6W
R294	24366101	Res, Carbon	100	J 1/6W
R295	24366680	Res, Carbon	68	J 1/6W
R296	24366820	Res, Carbon	82	J 1/6W
R297	24366102	Res, Carbon	1K	J 1/6W
R298	24366184	Res, Carbon	180K	J 1/6W
R301	24366103	Res, Carbon	10K	J 1/6W
R302	24366152	Res, Carbon	1.5K	J 1/6W
R303	24366103	Res, Carbon	10K	J 1/6W
R304	24366222	Res, Carbon	2.2K	J 1/6W
R305	24366221	Res, Carbon	220	J 1/6W
R306	24366154	Res, Carbon	150K	J 1/6W
R307	24366223	Res, Carbon	22K	J 1/6W
R308	24366103	Res, Carbon	10K	J 1/6W
R309	24366102	Res, Carbon	1K	J 1/6W
R310	24366152	Res, Carbon	1.5K	J 1/6W
R311	24366152	Res, Carbon	1.5K	J 1/6W
R312	24366222	Res, Carbon	2.2K	J 1/6W
R313	24366111	Res, Carbon	110	J 1/6W
R314	24366154	Res, Carbon	150K	J 1/6W
R315	24366103	Res, Carbon	10K	J 1/6W
R316	24366223	Res, Carbon	22K	J 1/6W
R317	24366472	Res, Carbon	4.7K	J 1/6W
R318	24366222	Res, Carbon	2.2K	J 1/6W
R319	24366472	Res, Carbon	4.7K	J 1/6W
R320	24366471	Res, Carbon	470	J 1/6W
R351	24066954	Res, Variable	2K	
R352	24066947	Res, Variable	500K	
R361	24366102	Res, Carbon	1K	J 1/6W
R363	24366511	Res, Carbon	510	J 1/6W
R364	24366203	Res, Carbon	20K	J 1/6W
R365	24366333	Res, Carbon	33K	J 1/6W
R367	24366274	Res, Carbon	270K	J 1/6W
R368	24366472	Res, Carbon	4.7K	J 1/6W
R369	24366221	Res, Carbon	220	J 1/6W
R370	24366103	Res, Carbon	10K	J 1/6W
R371	24366473	Res, Carbon	47K	J 1/6W
R372	24366103	Res, Carbon	10K	J 1/6W
R374	24366103	Res, Carbon	10K	J 1/6W
R376	24366472	Res, Carbon	4.7K	J 1/6W
R377	24366472	Res, Carbon	4.7K	J 1/6W
R378	24366472	Res, Carbon	4.7K	J 1/6W
R379	24366472	Res, Carbon	4.7K	J 1/6W
R380	24366221	Res, Carbon	220	J 1/6W
R381	24366102	Res, Carbon	1K	J 1/6W
R382	24366102	Res, Carbon	1K	J 1/6W
R383	24366514	Res, Carbon	510K	J 1/6W
R384	24366331	Res, Carbon	330	J 1/6W
R386	24366472	Res, Carbon	4.7K	J 1/6W
R387	24366102	Res, Carbon	1K	J 1/6W
R401	24366102	Res, Carbon	1K	J 1/6W
R402	24366203	Res, Carbon	20K	J 1/6W
R403	24366152	Res, Carbon	1.5K	J 1/6W
R404	24366203	Res, Carbon	20K	J 1/6W
R405	24366303	Res, Carbon	30K	J 1/6W
R406	24366203	Res, Carbon	20K	J 1/6W
R407	24366472	Res, Carbon	4.7K	J 1/6W
R408	24366152	Res, Carbon	1.5K	J 1/6W
R409	24366621	Res, Carbon	620	J 1/6W
R410	24366621	Res, Carbon	620	J 1/6W
R411	24366910	Res, Carbon	91	J 1/6W
R412	24366102	Res, Carbon	1K	J 1/6W
R413	24366471	Res, Carbon	470	J 1/6W
R414	24366183	Res, Carbon	18K	J 1/6W
R415	24366822	Res, Carbon	8.2K	J 1/6W
R416	24366101	Res, Carbon	100	J 1/6W
R417	24366132	Res, Carbon	1.3K	J 1/6W
R418	24366333	Res, Carbon	33K	J 1/6W
R419	24366273	Res, Carbon	27K	J 1/6W
R420	24366821	Res, Carbon	820	J 1/6W
R421	24366272	Res, Carbon	2.7K	J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R422	24366103	Res, Carbon	10K	J 1/6W	U801	70188777	P C Board Assy	Converter 1	
R423	24366821	Res, Carbon	820	J 1/6W	-	-	- DIODES -		
R424	24366272	Res, Carbon	2. 7K	J 1/6W	ΔD801	23118124	Diode (SID BRG)	LB-156 LF-B	
R425	24366103	Res, Carbon	10K	J 1/6W	D802	A7568200	Diode	1S1832	
R426	24366102	Res, Carbon	1K	J 1/6W	D810	70115449	Diode	S3LA20 (S)	
R428	24366271	Res, Carbon	270	J 1/6W	ΔD811	70115449	Diode	S3LA20 (S)	
R429	24366102	Res, Carbon	1K	J 1/6W	D813	A7978850	Diode	S5295G	
R432	24366821	Res, Carbon	820	J 1/6W	-	-	- COILS -		
R433	24366333	Res, Carbon	33K	J 1/6W	L801	70211045	Coil, Choke		
R434	24366333	Res, Carbon	33K	J 1/6W	-	-	- CAPACITORS -		
R435	24366103	Res, Carbon	10K	J 1/6W	ΔC801	70416068	Cap, Plastic	0. 1MF	M 250V
R436	24366682	Res, Carbon	6. 8K	J 1/6W	ΔC802	24094653	Cap, Ceramic	220PF	M 400V
R437	24366222	Res, Carbon	2. 2K	J 1/6W	ΔC803	24094653	Cap, Ceramic	220PF	M 400V
R438	24366271	Res, Carbon	270	J 1/6W	ΔC804	24086931	Cap, Electrolytic	8200MF	M 450V
R439	24366272	Res, Carbon	2. 7K	J 1/6W	C805	24095817	Cap, Plastic	0. 027MF	K 630V
R440	24366103	Res, Carbon	10K	J 1/6W	C806	24215101	Cap, Ceramic	100PF	K 1KV
R441	24366183	Res, Carbon	18K	J 1/6W	ΔC814	24094655	Cap, Ceramic	1000PF	M 400V
R442	24366102	Res, Carbon	1K	J 1/6W	ΔC820	24617884	Cap, Electrolytic	1000MF	M 25V
R443	24366471	Res, Carbon	470	J 1/6W	ΔC822	24617931	Cap, Electrolytic	1200MF	M 10V
R444	24366102	Res, Carbon	1K	J 1/6W	C823	24202101	Cap, Electrolytic	100MF	M 10V
R445	24366681	Res, Carbon	680	J 1/6W	C831	24204470	Cap, Electrolytic	47MF	M 25V
R446	24366102	Res, Carbon	1K	J 1/6W	C832	24214221	Cap, Ceramic	220PF	K 500V
R447	24366102	Res, Carbon	1K	J 1/6W	C833	24214221	Cap, Ceramic	220PF	K 500V
R448	24366472	Res, Carbon	4. 7K	J 1/6W	-	-	- RESISTORS -		
R449	24366101	Res, Carbon	100	J 1/6W	R801	24376154	Res, Carbon	150K	J 1/2W
R451	24066953	Res, Variable	5K		R803	24554563	Res, Oxide Metal	56K	J 2W
R452	24066953	Res, Variable	5K		ΔR809	24321338	Res, Oxide Metal	0. 33	J 1/2W
R459	24066956	Res, Variable	500		R810	24007487	Res, Cement	2. 2	J 2W
R461	24366472	Res, Carbon	4. 7K	J 1/6W	ΔR811	24556159	Res, Fusible	1. 5	K 1/2W
R462	24366472	Res, Carbon	4. 7K	J 1/6W	ΔR821	24000317	Res, Fusible	1	J 1/4W
R463	24366102	Res, Carbon	1K	J 1/6W	-	-	- MISCELLANEOUS -		
R464	24366223	Res, Carbon	22K	J 1/6W	ΔF801	23144129	Fuse, 2A		
R465	24366621	Res, Carbon	620	J 1/6W	ΔF801A	23165433	Fuse Holder		
R466	24366104	Res, Carbon	100K	J 1/6W	ΔF802	23144970	Fuse, 1. 6A		
R467	24366472	Res, Carbon	4. 7K	J 1/6W	ΔF802A	23165433	Fuse Holder		
R468	24366472	Res, Carbon	4. 7K	J 1/6W	ΔF803	23144836	Fuse, 125V, 1. 6A		
R469	24366223	Res, Carbon	22K	J 1/6W	ΔT801	70213157	Transformer	VPW8901M	
R470	24366223	Res, Carbon	22K	J 1/6W	ΔT831	23211864	Coil, Linefilter	TRF3144	
R471	24366821	Res, Carbon	820	J 1/6W	U01	70188778	P C Board Assy	Logic SW	
R472	24366223	Res, Carbon	22K	J 1/6W	-	-	- DIODES -		
R473	24366271	Res, Carbon	270	J 1/6W	DX07	A7160590	Diode	1SS177	
R474	24366751	Res, Carbon	750	J 1/6W	DX08	A7160590	Diode	1SS177	
R475	24366361	Res, Carbon	360	J 1/6W	DX09	A7160590	Diode	1SS177	
R476	24366471	Res, Carbon	470	J 1/6W	DX10	A7160590	Diode	1SS177	
R477	24366511	Res, Carbon	510	J 1/6W	DX11	A7160590	Diode	1SS177	
R481	24366471	Res, Carbon	470	J 1/6W	DX12	A7160590	Diode	1SS177	
R482	24366821	Res, Carbon	820	J 1/6W	DX13	A7160590	Diode	1SS177	
R730	24366684	Res, Carbon	680K	J 1/6W	DX14	A7160590	Diode	1SS177	
R731	24366563	Res, Carbon	56K	J 1/6W	DX34	A8606316	Diode, LED	TLG133A-FA	
R732	24366242	Res, Carbon	2. 4K	J 1/6W	-	-	- MISCELLANEOUS -		
R733	24366122	Res, Carbon	1. 2K	J 1/6W	PX01B	23902605	Socket, 12P		
R734	24366391	Res, Carbon	390	J 1/6W	SL09	23344094	Push Switch		
R735	24366103	Res, Carbon	10K	J 1/6W	SX01	23145394	Push Switch, 1C1P		
R736	24366302	Res, Carbon	3K	J 1/6W	SX02	23145394	Push Switch, 1C1P		
R738	24366241	Res, Carbon	240	J 1/6W	SX03	23145394	Push Switch, 1C1P		
R741	24366562	Res, Carbon	5. 6K	J 1/6W	SX04	23145394	Push Switch, 1C1P		
R751	24066952	Res, Variable	10K		SX06	23145394	Push Switch, 1C1P		
R752	24066948	Res, Variable	200K		SX07	23145394	Push Switch, 1C1P		
		- MISCELLANEOUS -			SX08	23145394	Push Switch, 1C1P		
P250	23365627	Phono Jack	4P		SX09	23145394	Push Switch, 1C1P		
S001	23145404	Slide Switch, 2C3P			SX10	23145394	Push Switch, 1C1P		
S203	23145409	Slide Switch	2C2P		SX11	23145394	Push Switch, 1C1P		
V204	70867457	Spacer			SX12	23145394	Push Switch, 1C1P		
X201	70153037	Crystal, 3. 58MHz			SX13	23145394	Push Switch, 1C1P		
X202	23153979	Crystal, 4. 43MHz			SX20	23344094	Push Switch		
X203	23153770	Crystal			SX29	23145394	Push Switch, 1C1P		
X204	23153899	Crystal							
Z001	24000787	Res, Block	4. 7K	J 1/8W	U602	70188779	P C Board Assy	Sub Main	
Z201	23107631	Filter, 3. 2MHz, TLC1126N			-	-	- INTEGRATED CIRCUITS -		
Z301	23107980	Filter	4. 5MHz		IC501	70128515	IC	TMP91C642N3052Z	
Z302	23107980	Filter	4. 5MHz		IC502	70119581	IC	NJM2902N	
Z401	70138117	Filter			IC503	80349260	IC	TA75393P	
Z402	70138131	Filter			IC602	70128007	IC	MC14013BCP	
Z403	70138128	Filter			IC603	80320660	IC	TA7291P	

LOCATION NUMBER	PART NUMBER	DESCRIPTION
IC604	B0349260	IC TA75393P
IC605	70128387	IC PST572D
ICX82	70128386	IC PST572C
- TRANSISTORS -		
Q090	A6534430	Transistor 2SA1048-Y
Q511	A6868350	Transistor 2SD1413
Q512	A6868350	Transistor 2SD1413
Q513	A6002040	Transistor RN1204
Q520	A6002040	Transistor RN1204
Q521	A6332540	Transistor 2SC2668-Y
Q522	A6332540	Transistor 2SC2668-Y
Q523	A6332430	Transistor 2SC2458-Y
Q524	A6002040	Transistor RN1204
Q525	A6534430	Transistor 2SA1048-Y
Q530	A6012020	Transistor RN2202
Q532	A6012020	Transistor RN2202
Q613	A6533247	Transistor 2SA966-Y
Q614	A6534430	Transistor 2SA1048-Y
Q615	A6534430	Transistor 2SA1048-Y
Q617	A6533247	Transistor 2SA966-Y
Q618	A6002040	Transistor RN1204
Q619	A6332430	Transistor 2SC2458-Y
Q620	A6002040	Transistor RN1204
Q621	A6002040	Transistor RN1204
Q622	A6002010	Transistor RN1201
- DIODES -		
D090	A7160570	Diode 1SS176
D091	A7160570	Diode 1SS176
D501	A7117325	Diode, Zener 04A213Z
D505	23316270	Diode DA218S
D506	A7151450	Diode 1SS200
D507	A7160570	Diode 1SS176
D601	A7160570	Diode 1SS176
D602	A7160570	Diode 1SS176
D603	A7160570	Diode 1SS176
D604	A7160570	Diode 1SS176
DX60	A7160570	Diode 1SS176
- COILS -		
L501	23237983	Coil, Peaking TRF4220AC
L502	23237977	Coil, Peaking TRF4680AC
L503	23103961	Coil, Choke 2BF253D-01
L504	23103961	Coil, Choke 2BF253D-01
L505	23103961	Coil, Choke 2BF253D-01
L506	23103961	Coil, Choke 2BF253D-01
L507	23103961	Coil, Choke 2BF253D-01
L841	23238653	Coil, Peaking TRF4470A1
- CAPACITORS -		
C090	24797101	Cap, Electrolytic 100MF M 50V
C501	24203100	Cap, Electrolytic 10MF M 16V
C502	24353220	Cap, Ceramic 22PF J 50V
C503	24353220	Cap, Ceramic 22PF J 50V
C504	24591473	Cap, Plastic 0.047MF J 50V
C505	24474103	Cap, Ceramic 0.01MF N 16V
C506	24591103	Cap, Plastic 0.01MF J 50V
C507	24591103	Cap, Plastic 0.01MF J 50V
C508	24591102	Cap, Plastic 1000PF J 50V
C509	24591102	Cap, Plastic 1000PF J 50V
C511	24474102	Cap, Ceramic 1000PF K 50V
C512	24474102	Cap, Ceramic 1000PF K 50V
C513	24794101	Cap, Electrolytic 100MF M 16V
C514	24794101	Cap, Electrolytic 100MF M 16V
C515	24206229	Cap, Electrolytic 2.2MF M 50V
C520	24794470	Cap, Electrolytic 47MF M 16V
C521	24474332	Cap, Ceramic 3300PF N 16V
C522	24794470	Cap, Electrolytic 47MF M 16V
C523	24474103	Cap, Ceramic 0.01MF N 16V
C524	24474561	Cap, Ceramic 560PF K 50V
C525	24473470	Cap, Ceramic 47PF J 50V
C526	24085987	Cap, Electrolytic 4.7MF M 16V
C527	24591243	Cap, Plastic 0.024MF J 50V
C531	24203100	Cap, Electrolytic 10MF M 16V
C532	24474103	Cap, Ceramic 0.01MF N 16V
C538	24538104	Cap, Plastic 0.1MF J 50V
C540	24474103	Cap, Ceramic 0.01MF N 16V
C541	24793101	Cap, Electrolytic 100MF M 10V

LOCATION NUMBER	PART NUMBER	DESCRIPTION
C542	24538104	Cap, Plastic 0.1MF J 50V
C543	24538104	Cap, Plastic 0.1MF J 50V
C544	24474103	Cap, Ceramic 0.01MF N 16V
C545	24436101	Cap, Ceramic 100PF J 50V
C546	24474103	Cap, Ceramic 0.01MF N 16V
C560	24474331	Cap, Ceramic 330PF K 50V
C561	24206229	Cap, Electrolytic 2.2MF M 50V
C562	24474331	Cap, Ceramic 330PF K 50V
C563	24206229	Cap, Electrolytic 2.2MF M 50V
C564	24474103	Cap, Ceramic 0.01MF N 16V
C565	24206010	Cap, Electrolytic 1MF M 50V
C567	24203220	Cap, Electrolytic 22MF M 16V
C568	24474101	Cap, Ceramic 100PF K 50V
C602	24474103	Cap, Ceramic 0.01MF N 16V
C603	24794101	Cap, Electrolytic 100MF M 16V
C604	24232223	Cap, Ceramic 0.022MF Z 50V
C605	24206010	Cap, Electrolytic 1MF M 50V
C610	24474103	Cap, Ceramic 0.01MF N 16V
C613	24794470	Cap, Electrolytic 47MF M 16V
C617	24792331	Cap, Electrolytic 330MF M 6.3V
C619	24206010	Cap, Electrolytic 1MF M 50V
C620	24538104	Cap, Plastic 0.1MF J 50V
C621	24474103	Cap, Ceramic 0.01MF N 16V
C841	24793101	Cap, Electrolytic 100MF M 10V
CX60	24090979	Cap, Super 0.047F Z 5.5V
CX61	24792471	Cap, Electrolytic 470MF M 6.3V
- RESISTORS -		
R095	24367121	Res, Carbon 120 G 1/6W
R096	24366363	Res, Carbon 36K J 1/6W
R501	24366472	Res, Carbon 4.7K J 1/6W
R502	24366472	Res, Carbon 4.7K J 1/6W
R503	24366163	Res, Carbon 16K J 1/6W
R504	24366432	Res, Carbon 4.3K J 1/6W
R505	24366202	Res, Carbon 2K J 1/6W
R506	24366114	Res, Carbon 110K J 1/6W
R507	24366114	Res, Carbon 110K J 1/6W
R508	24366473	Res, Carbon 47K J 1/6W
R509	24366473	Res, Carbon 47K J 1/6W
R510	24366472	Res, Carbon 4.7K J 1/6W
R511	24366472	Res, Carbon 4.7K J 1/6W
R512	24366163	Res, Carbon 16K J 1/6W
R513	24366472	Res, Carbon 4.7K J 1/6W
R520	24366472	Res, Carbon 4.7K J 1/6W
R521	24366152	Res, Carbon 1.5K J 1/6W
R522	24366122	Res, Carbon 1.2K J 1/6W
R523	24366331	Res, Carbon 330 J 1/6W
R524	24366105	Res, Carbon 1M J 1/6W
R525	24366182	Res, Carbon 1.8K J 1/6W
R526	24366203	Res, Carbon 20K J 1/6W
R527	24366105	Res, Carbon 1M J 1/6W
R528	24366623	Res, Carbon 62K J 1/6W
R529	24366753	Res, Carbon 75K J 1/6W
R530	24366754	Res, Carbon 750K J 1/6W
R531	24366223	Res, Carbon 22K J 1/6W
R532	24366222	Res, Carbon 2.2K J 1/6W
R533	24366753	Res, Carbon 75K J 1/6W
R534	24366333	Res, Carbon 33K J 1/6W
R535	24366361	Res, Carbon 360 J 1/6W
R536	24366472	Res, Carbon 4.7K J 1/6W
R537	24366472	Res, Carbon 4.7K J 1/6W
R538	24366101	Res, Carbon 100 J 1/6W
R539	24366821	Res, Carbon 820 J 1/6W
R540	24366151	Res, Carbon 150 J 1/6W
R541	24366123	Res, Carbon 12K J 1/6W
R542	24366103	Res, Carbon 10K J 1/6W
R543	24366151	Res, Carbon 150 J 1/6W
R544	24366473	Res, Carbon 47K J 1/6W
R545	24366682	Res, Carbon 6.8K J 1/6W
R546	24366391	Res, Carbon 390 J 1/6W
R547	24366560	Res, Carbon 56 J 1/6W
R548	24366103	Res, Carbon 10K J 1/6W
R549	24366222	Res, Carbon 2.2K J 1/6W
R560	24366182	Res, Carbon 1.8K J 1/6W
R561	24366473	Res, Carbon 47K J 1/6W
R562	24366473	Res, Carbon 47K J 1/6W

LOCATION NUMBER	PART NUMBER	DESCRIPTION			LOCATION NUMBER	PART NUMBER	DESCRIPTION		
R563	24941275	Res, Composition	2.7M	J 1/4W	R679	24366472	Res, Carbon	4.7K	J 1/6W
R564	24366392	Res, Carbon	3.9K	J 1/6W	R681	24366102	Res, Carbon	1K	J 1/6W
R565	24366392	Res, Carbon	3.9K	J 1/6W	R682	24366102	Res, Carbon	1K	J 1/6W
R566	24366822	Res, Carbon	8.2K	J 1/6W	R683	24366472	Res, Carbon	4.7K	J 1/6W
R567	24366182	Res, Carbon	1.8K	J 1/6W	R684	24366152	Res, Carbon	1.5K	J 1/6W
R568	24366563	Res, Carbon	56K	J 1/6W	R685	24366472	Res, Carbon	4.7K	J 1/6W
R569	24366242	Res, Carbon	2.4K	J 1/6W	R686	24366102	Res, Carbon	1K	J 1/6W
R570	24366362	Res, Carbon	3.6K	J 1/6W	R687	24366101	Res, Carbon	100	J 1/6W
R571	24366473	Res, Carbon	47K	J 1/6W	R688	24366472	Res, Carbon	4.7K	J 1/6W
R572	24366473	Res, Carbon	47K	J 1/6W	R689	24366472	Res, Carbon	4.7K	J 1/6W
R573	24941275	Res, Composition	2.7M	J 1/4W	R690	24366472	Res, Carbon	4.7K	J 1/6W
R574	24366392	Res, Carbon	3.9K	J 1/6W	R691	24366472	Res, Carbon	4.7K	J 1/6W
R575	24366392	Res, Carbon	3.9K	J 1/6W	RX69	24366301	Res, Carbon	300	J 1/6W
R576	24366822	Res, Carbon	8.2K	J 1/6W	RX75	24366472	Res, Carbon	4.7K	J 1/6W
R577	24366222	Res, Carbon	2.2K	J 1/6W	RX77	24366151	Res, Carbon	150	J 1/6W
R578	24000525	Res, Metal	4.7K	F 1/4W			- MISCELLANEOUS -		
R579	24000525	Res, Metal	4.7K	F 1/4W	P502	23164505	Plug, 3P		
R580	24366102	Res, Carbon	1K	J 1/6W	P504	23368095	Plug	4P	
R581	24366102	Res, Carbon	1K	J 1/6W	P601	23901261	Socket, 18P		
R582	24366102	Res, Carbon	1K	J 1/6W	P603	23901256	Socket	13P	
R583	24366102	Res, Carbon	1K	J 1/6W	Q512C	23721308	Screw	3x8mm	
R585	24366102	Res, Carbon	1K	J 1/6W	X501	23153759	Crystal		
R586	24366103	Res, Carbon	10K	J 1/6W	△2612	23118122	IC Protector, ICP-N5		
R587	24366102	Res, Carbon	1K	J 1/6W	△2613	23118122	IC Protector, ICP-N5		
R588	24366103	Res, Carbon	10K	J 1/6W	Z801	23107550	DC-DC Converter, CTX006		
R589	24366103	Res, Carbon	10K	J 1/6W	△Z802	23118132	IC Protector	ICP-N10	
R603	24366473	Res, Carbon	47K	J 1/6W	■UV01	70188780	P C Board Assy	Pre Amp	
R604	24366102	Res, Carbon	1K	J 1/6W			- INTEGRATED CIRCUITS -		
R605	24366102	Res, Carbon	1K	J 1/6W	ICV01	70129036	IC	AN3383K	
R606	24366134	Res, Carbon	130K	J 1/6W			- TRANSISTORS -		
R607	24366822	Res, Carbon	8.2K	J 1/6W	QV02	A6332430	Transistor	2SC2458-Y	
R608	24366914	Res, Carbon	910K	J 1/6W	QV03	A6332430	Transistor	2SC2458-Y	
R609	24366304	Res, Carbon	300K	J 1/6W			- DIODES -		
R613	24366103	Res, Carbon	10K	J 1/6W	DV01	A7160570	Diode	1SS176	
R614	24366103	Res, Carbon	10K	J 1/6W			- COILS -		
R615	24366183	Res, Carbon	18K	J 1/6W	LV01	23289470	Coil, Peaking	TRF4470AF	
R616	24366183	Res, Carbon	18K	J 1/6W	LV02	23289101	Coil, Peaking	TRF4101AF	
R617	24366472	Res, Carbon	4.7K	J 1/6W	LV03	23238705	Coil, Peaking	TRF4560AJ	
R618	24366102	Res, Carbon	1K	J 1/6W	LV04	23289271	Coil, Peaking	TRF4271AF	
R619	24366102	Res, Carbon	1K	J 1/6W			- CAPACITORS -		
R620	24366332	Res, Carbon	3.3K	J 1/6W	CV01	24206228	Cap, Electrolytic	0.22MF	M 50V
R621	24366682	Res, Carbon	6.8K	J 1/6W	CV02	24538104	Cap, Plastic	0.1MF	J 50V
R622	24366102	Res, Carbon	1K	J 1/6W	CV03	24538104	Cap, Plastic	0.1MF	J 50V
R623	24366472	Res, Carbon	4.7K	J 1/6W	CV04	24206228	Cap, Electrolytic	0.22MF	M 50V
R624	24366472	Res, Carbon	4.7K	J 1/6W	CV05	24206108	Cap, Electrolytic	0.1MF	M 50V
R625	24366472	Res, Carbon	4.7K	J 1/6W	CV06	24206228	Cap, Electrolytic	0.22MF	M 50V
R626	24366223	Res, Carbon	22K	J 1/6W	CV07	24538104	Cap, Plastic	0.1MF	J 50V
R629	24366243	Res, Carbon	24K	J 1/6W	CV08	24538104	Cap, Plastic	0.1MF	J 50V
R630	24366223	Res, Carbon	22K	J 1/6W	CV09	24206108	Cap, Electrolytic	0.1MF	M 50V
R631	24366472	Res, Carbon	4.7K	J 1/6W	CV10	24206228	Cap, Electrolytic	0.22MF	M 50V
R632	24366472	Res, Carbon	4.7K	J 1/6W	CV11	24474103	Cap, Ceramic	0.01MF	N 16V
R633	24366472	Res, Carbon	4.7K	J 1/6W	CV12	24201470	Cap, Electrolytic	47MF	M 6.3V
R641	24366223	Res, Carbon	22K	J 1/6W	CV13	24201470	Cap, Electrolytic	47MF	M 6.3V
R642	24366103	Res, Carbon	10K	J 1/6W	CV14	24206010	Cap, Electrolytic	1MF	M 50V
R643	24366473	Res, Carbon	47K	J 1/6W	CV15	24436101	Cap, Ceramic	100PF	J 50V
R644	24366105	Res, Carbon	1M	J 1/6W	CV16	24851223	Cap, Ceramic	0.022MF	K 25V
R645	24366562	Res, Carbon	5.6K	J 1/6W	CV17	24538104	Cap, Plastic	0.1MF	J 50V
R646	24366333	Res, Carbon	33K	J 1/6W	CV18	24707685	Cap, Tantalum	6.8MF	M 35V
R647	24366472	Res, Carbon	4.7K	J 1/6W	CV19	24203470	Cap, Electrolytic	47MF	M 16V
R660	24366103	Res, Carbon	10K	J 1/6W	CV20	24436101	Cap, Ceramic	100PF	J 50V
R661	24366101	Res, Carbon	100	J 1/6W	CV21	24474103	Cap, Ceramic	0.01MF	N 16V
R662	24366101	Res, Carbon	100	J 1/6W	CV22	24473470	Cap, Ceramic	47PF	J 50V
R663	24366101	Res, Carbon	100	J 1/6W	CV23	24473470	Cap, Ceramic	47PF	J 50V
R664	24366102	Res, Carbon	1K	J 1/6W	CV24	24473330	Cap, Ceramic	33PF	J 50V
R665	24366102	Res, Carbon	1K	J 1/6W	CV25	24473330	Cap, Ceramic	33PF	J 50V
R666	24366103	Res, Carbon	10K	J 1/6W	CV26	24474103	Cap, Ceramic	0.01MF	N 16V
R670	24366101	Res, Carbon	100	J 1/6W	CV27	24436101	Cap, Ceramic	100PF	J 50V
R671	24366103	Res, Carbon	10K	J 1/6W	CV28	24436131	Cap, Ceramic	130PF	J 50V
R672	24366473	Res, Carbon	47K	J 1/6W	CV29	24474103	Cap, Ceramic	0.01MF	N 16V
R673	24366472	Res, Carbon	4.7K	J 1/6W	CV30	24473680	Cap, Ceramic	68PF	J 50V
R674	24366472	Res, Carbon	4.7K	J 1/6W	CV31	24473470	Cap, Ceramic	47PF	J 50V
R675	24366472	Res, Carbon	4.7K	J 1/6W	CV32	24473680	Cap, Ceramic	68PF	J 50V
R676	24366101	Res, Carbon	100	J 1/6W	CV33	24436820	Cap, Ceramic	82PF	J 50V
R677	24366103	Res, Carbon	10K	J 1/6W			- RESISTORS -		
R678	24366103	Res, Carbon	10K	J 1/6W					

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
RV01	24366391	Res, Carbon	390	J 1/6W
RV02	24366471	Res, Carbon	470	J 1/6W
RV03	24366391	Res, Carbon	390	J 1/6W
RV04	24366271	Res, Carbon	270	J 1/6W
RV05	24366471	Res, Carbon	470	J 1/6W
RV06	24366271	Res, Carbon	270	J 1/6W
RV07	24366102	Res, Carbon	1K	J 1/6W
RV08	24366681	Res, Carbon	680	J 1/6W
RV09	24366302	Res, Carbon	3K	J 1/6W
RV10	24366472	Res, Carbon	4.7K	J 1/6W
RV11	24366333	Res, Carbon	33K	J 1/6W
RV12	24366101	Res, Carbon	100	J 1/6W
RV13	24366101	Res, Carbon	100	J 1/6W
RV14	24366102	Res, Carbon	1K	J 1/6W
RV15	24366101	Res, Carbon	100	J 1/6W
RV16	24366102	Res, Carbon	1K	J 1/6W
RV17	24366102	Res, Carbon	1K	J 1/6W
RV18	24366102	Res, Carbon	1K	J 1/6W
RV19	24366183	Res, Carbon	18K	J 1/6W
RV20	24366562	Res, Carbon	5.6K	J 1/6W
RV21	24366124	Res, Carbon	120K	J 1/6W
PV01	23367992	MISCELLANEOUS - Plug, 9P		
U701	70198968	P C Board Assy, AUDIO - INTEGRATED CIRCUITS -		
IC701	70119932	IC BA7765AS - TRANSISTORS -		
Q702	A6319311	Transistor 2SC1959-Y - COILS -		
L701	23237729	Coil, Peaking TRF4822AP		
L702	23237969	Coil, Peaking TRF4331AC - CAPACITORS -		
C701	24436821	Cap, Ceramic 820PF	J 50V	
C702	24212332	Cap, Ceramic 3300PF	K 50V	
C703	24206479	Cap, Electrolytic 4.7MF	M 50V	
C704	24212101	Cap, Ceramic 100PF	K 50V	
C705	24591103	Cap, Plastic 0.01MF	J 50V	
C706	24203100	Cap, Electrolytic 10MF	M 16V	
C707	24203100	Cap, Electrolytic 10MF	M 16V	
C708	24203470	Cap, Electrolytic 47MF	M 16V	
C709	24085988	Cap, Electrolytic 1MF	M 50V	
C713	24206479	Cap, Electrolytic 4.7MF	M 50V	
C714	24591822	Cap, Plastic 8200PF	J 50V	
C715	24591183	Cap, Plastic 0.018MF	J 50V	
C716	24591203	Cap, Plastic 0.02MF	J 50V	
C717	24206010	Cap, Electrolytic 1MF	M 50V	
C718	24206010	Cap, Electrolytic 1MF	M 50V	
C719	24204330	Cap, Electrolytic 33MF	M 25V	
C720	24591103	Cap, Plastic 0.01MF	J 50V	
C721	24591103	Cap, Plastic 0.01MF	J 50V	
C722	24203470	Cap, Electrolytic 47MF	M 16V	
C723	24082049	Cap, Plastic 0.047MF	J 100V	
C724	24214221	Cap, Ceramic 220PF	K 500V	
C725	24232103	Cap, Ceramic 0.01MF - RESISTORS -	Z 50V	
R701	24360473	Res, Carbon 47K	J 1/8W	
R702	24360511	Res, Carbon 510	J 1/8W	
R703	24360334	Res, Carbon 330K	J 1/8W	
R704	24360221	Res, Carbon 220	J 1/8W	
R705	24360123	Res, Carbon 12K	J 1/8W	
R706	24360562	Res, Carbon 5.6K	J 1/8W	
R707	24360105	Res, Carbon 1M	J 1/8W	
R708	24360272	Res, Carbon 2.7K	J 1/8W	
R709	24360103	Res, Carbon 10K	J 1/8W	
R711	24360102	Res, Carbon 1K	J 1/8W	
R712	24360102	Res, Carbon 1K	J 1/8W	
R713	24360273	Res, Carbon 27K	J 1/8W	
R714	24360472	Res, Carbon 4.7K	J 1/8W	
R715	24360392	Res, Carbon 3.9K	J 1/8W	
R716	24360100	Res, Carbon 10	J 1/8W	
R717	24360201	Res, Carbon 200	J 1/8W	
R718	24360562	Res, Carbon 5.6K	J 1/8W	
R719	24360333	Res, Carbon 33K	J 1/8W	
R720	24360229	Res, Carbon 2.2	J 1/8W	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
# R721	24360101	Res, Carbon 100	J 1/8W	
# R722	24360822	Res, Carbon 8.2K	J 1/8W	
T701	23224916	MISCELLANEOUS - Coil	TLN1069T	
U803	70188781	P C Board Assy - TRANSISTORS -	Converter 2	
Q801	23314520	IC - DIODES -	STRD1706L902	
D803	23118056	Diode	AG01	
D804	23118056	Diode	AG01	
D805	23118056	Diode	AG01	
D806	23118056	Diode	AG01	
C807	24591472	- CAPACITORS - Cap, Plastic	4700PF	J 50V
C808	24538223	Cap, Plastic	0.022MF	J 50V
C809	24617734	Cap, Electrolytic	100MF	M 50V
C810	24538333	Cap, Plastic	0.033MF	J 50V
C811	24538473	Cap, Plastic	0.047MF	J 50V
C812	24617795	Cap, Electrolytic	100MF	M 25V
R802	24376154	- RESISTORS - Res, Carbon	150K	J 1/2W
R805	24554470	Res, Oxide Metal	47	J 2W
R806	24554470	Res, Oxide Metal	47	J 2W
R807	24552180	Res, Oxide Metal	18	J 1/2W
R808	24366100	Res, Carbon 10	J 1/6W	
Q801B	70391355	- MISCELLANEOUS - Screw	3x8mm	
U804	70188782	P C Board Assy - INTEGRATED CIRCUITS -	Regulator	
IC820	70119737	IC - TRANSISTORS -	BA10324	
Q812	23314141	Transistor	2SC3852	
Q813	A6002020	Transistor	RN1202	
Q814	A6325549	Transistor	2SC2236-Y	
Q815	70114344	Transistor	2SD1198A-Q	
Q816	A6319311	Transistor	2SC1959-Y	
D816	70115421	- DIODES - Diode, Zener	EQA02-05E	
D817	A7160570	Diode	1SS176	
D818	A7160570	Diode	1SS176	
D819	A7160570	Diode	1SS176	
D820	A7160570	Diode	1SS176	
C824	24203220	- CAPACITORS - Cap, Electrolytic	22MF	M 16V
C826	24794470	Cap, Electrolytic	47MF	M 16V
C827	24793101	Cap, Electrolytic	100MF	M 10V
C828	24794470	Cap, Electrolytic	47MF	M 16V
C830	24206010	Cap, Electrolytic	1MF	M 50V
C834	24203220	Cap, Electrolytic	22MF	M 16V
R822	24366820	- RESISTORS - Res, Carbon	82	J 1/6W
R823	24367392	Res, Carbon	3.9K	G 1/6W
R824	24367682	Res, Carbon	6.8K	G 1/6W
R825	24366152	Res, Carbon	1.5K	J 1/6W
R826	24366301	Res, Carbon	300	J 1/6W
R827	24366472	Res, Carbon	4.7K	J 1/6W
R829	24366102	Res, Carbon	1K	J 1/6W
R830	24366471	Res, Carbon	470	J 1/6W
R831	24366104	Res, Carbon	100K	J 1/6W
U805	70188783	P C Board Assy - TRANSISTORS -	Power Tr	
Q810	23314141	Transistor	2SC3852	
U801	70188774	P C Board Assy - INTEGRATED CIRCUITS -	PIF Second	
IC808	B0383400	IC - TRANSISTORS -	TA8710S	
Q801	A6534430	Transistor	2SA1048-Y	
Q802	A6012040	Transistor	RN2204	
Q803	A6332430	Transistor	2SC2458-Y	
Q804	A6332430	Transistor	2SC2458-Y	
Q805	A6332430	Transistor	2SC2458-Y	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		LOCATION NUMBER	PART NUMBER	DESCRIPTION	
QB06	A6332430	Transistor	2SC2458-Y	DX02	A7160590	Diode	1SS177
QB07	A6332430	Transistor	2SC2458-Y	DX04	A7160590	Diode	1SS177
QB09	A6002020	Transistor	RN1202	DX06	A7160590	Diode	1SS177
QB10	A6002020	Transistor	RN1202	DX15	A7160590	Diode	1SS177
QB11	A6002020	Transistor	RN1202	DX16	A7160590	Diode	1SS177
QB12	A6002020	Transistor	RN1202	DX17	A7160590	Diode	1SS177
		- COILS -		DX18	A7160590	Diode	1SS177
LB01	23238713	Coil, Peaking	TRF4120AJ	DX19	A7160590	Diode	1SS177
LB02	23238706	Coil, Peaking	TRF4470AJ	DX20	A7160590	Diode	1SS177
LB51	23262782	Coil, IF	TRF1108	DX21	A7160590	Diode	1SS177
LB52	23262739	Coil, IF	TRF1126D	DX22	A7160590	Diode	1SS177
		- CAPACITORS -		DX24	A7160590	Diode	1SS177
CB01	24591223	Cap, Plastic	0.022MF J 50V	DX26	A7160590	Diode	1SS177
CB02	24591363	Cap, Plastic	0.036MF J 50V	DX36	23316270	Diode	DA218S
CB03	24206010	Cap, Electrolytic	1MF M 50V			- CAPACITORS -	
CB04	24203100	Cap, Electrolytic	10MF M 16V	CX01	24630858	Cap, Electrolytic	47MF M 10V
CB05	24206228	Cap, Electrolytic	0.22MF M 50V	CX03	24474101	Cap, Ceramic	100PF K 50V
CB06	24203470	Cap, Electrolytic	47MF M 16V	CX04	24474101	Cap, Ceramic	100PF K 50V
CB07	24473470	Cap, Ceramic	47PF J 50V	CX05	24473100	Cap, Ceramic	10PF J 50V
CB08	24473470	Cap, Ceramic	47PF J 50V	CX08	24474103	Cap, Ceramic	0.01MF N 16V
CB09	24474103	Cap, Ceramic	0.01MF N 16V	CX10	24630858	Cap, Electrolytic	47MF M 10V
CB11	24474471	Cap, Ceramic	470PF K 50V	CX11	24474103	Cap, Ceramic	0.01MF N 16V
CB12	24474471	Cap, Ceramic	470PF K 50V	CX12	24474102	Cap, Ceramic	1000PF K 50V
CB14	24474103	Cap, Ceramic	0.01MF N 16V	CX13	24630858	Cap, Electrolytic	47MF M 10V
CB15	24203470	Cap, Electrolytic	47MF M 16V	CX29	24474103	Cap, Ceramic	0.01MF N 16V
CB16	24474103	Cap, Ceramic	0.01MF N 16V	CX30	24474102	Cap, Ceramic	1000PF K 50V
CB17	24474103	Cap, Ceramic	0.01MF N 16V	CX51	24093953	Cap, Variable	
CB18	24474103	Cap, Ceramic	0.01MF N 16V			- RESISTORS -	
CB19	24474103	Cap, Ceramic	0.01MF N 16V	RX01	24366223	Res, Carbon	22K J 1/6W
		- RESISTORS -		RX02	24366223	Res, Carbon	22K J 1/6W
RB01	24366223	Res, Carbon	22K J 1/6W	RX03	24366223	Res, Carbon	22K J 1/6W
RB02	24366104	Res, Carbon	100K J 1/6W	RX04	24366223	Res, Carbon	22K J 1/6W
RB03	24366474	Res, Carbon	470K J 1/6W	RX05	24366103	Res, Carbon	10K J 1/6W
RB04	24366243	Res, Carbon	24K J 1/6W	RX06	24366103	Res, Carbon	10K J 1/6W
RB06	24366103	Res, Carbon	10K J 1/6W	RX07	24366103	Res, Carbon	10K J 1/6W
RB07	24366101	Res, Carbon	100 J 1/6W	RX08	24366103	Res, Carbon	10K J 1/6W
RB09	24366222	Res, Carbon	2.2K J 1/6W	RX09	24366223	Res, Carbon	22K J 1/6W
RB11	24366391	Res, Carbon	390 J 1/6W	RX10	24366101	Res, Carbon	100 J 1/6W
RB13	24366103	Res, Carbon	10K J 1/6W	RX11	24366103	Res, Carbon	10K J 1/6W
RB15	24366331	Res, Carbon	330 J 1/6W	RX12	24366102	Res, Carbon	1K J 1/6W
RB16	24366331	Res, Carbon	330 J 1/6W	RX13	24366221	Res, Carbon	220 J 1/6W
RB17	24366100	Res, Carbon	10 J 1/6W	RX14	24366102	Res, Carbon	1K J 1/6W
RB19	24366333	Res, Carbon	33K J 1/6W	RX15	24366221	Res, Carbon	220 J 1/6W
RB20	24366123	Res, Carbon	12K J 1/6W	RX16	24366221	Res, Carbon	220 J 1/6W
RB21	24366222	Res, Carbon	2.2K J 1/6W	RX17	24366221	Res, Carbon	220 J 1/6W
RB22	24366471	Res, Carbon	470 J 1/6W	RX18	24366101	Res, Carbon	100 J 1/6W
RB23	24366471	Res, Carbon	470 J 1/6W	RX19	24366102	Res, Carbon	1K J 1/6W
RB24	24366152	Res, Carbon	1.5K J 1/6W	RX20	24366102	Res, Carbon	1K J 1/6W
RB25	24366821	Res, Carbon	820 J 1/6W	RX21	24366102	Res, Carbon	1K J 1/6W
RB26	24366105	Res, Carbon	1M J 1/6W	RX22	24366683	Res, Carbon	68K J 1/6W
RB28	24366471	Res, Carbon	470 J 1/6W	RX23	24366683	Res, Carbon	68K J 1/6W
RB29	24366471	Res, Carbon	470 J 1/6W	RX24	24366105	Res, Carbon	1M J 1/6W
RB30	24366222	Res, Carbon	2.2K J 1/6W	RX25	24941515	Res, Composition	5.1M J 1/4W
RB31	24366271	Res, Carbon	270 J 1/6W	RX26	24941515	Res, Composition	5.1M J 1/4W
RB32	24366102	Res, Carbon	1K J 1/6W	RX29	24366103	Res, Carbon	10K J 1/6W
		- MISCELLANEOUS -		RX30	24366222	Res, Carbon	2.2K J 1/6W
PB01	23367434	Plug, 15P		RX31	24366101	Res, Carbon	100 J 1/6W
XB01	23153900	Resonator, 500KHz, TCR1010		RX32	24366101	Res, Carbon	100 J 1/6W
ZB01	23107948	Filter, 6.0MHz		RX33	24366102	Res, Carbon	1K J 1/6W
ZB02	23107949	Filter, Ceramic, 6.5MHz		RX34	24366303	Res, Carbon	30K J 1/6W
ZB03	23107947	Filter, SIF, 5.5MHz		RX35	24366104	Res, Carbon	100K J 1/6W
ZB04	23107948	Filter, 6.0MHz		RX36	24366102	Res, Carbon	1K J 1/6W
UX01	70188775	P C Board Assy	Timer	RX37	24366102	Res, Carbon	1K J 1/6W
		- INTEGRATED CIRCUITS -		RX38	24366473	Res, Carbon	47K J 1/6W
ICX01	70128498	IC	M50957-236SP	RX39	24366101	Res, Carbon	100 J 1/6W
ICX02	70128386	IC	PST572C	RX40	24366223	Res, Carbon	22K J 1/6W
ICX10	70128192	IC	BR93C46	RX41	24366223	Res, Carbon	22K J 1/6W
		- TRANSISTORS -		RX42	24366472	Res, Carbon	4.7K J 1/6W
QX05	A6012020	Transistor	RN2202	RX43	24366472	Res, Carbon	4.7K J 1/6W
QX06	A6012020	Transistor	RN2202	RX44	24366102	Res, Carbon	1K J 1/6W
QX07	A6002040	Transistor	RN1204	RX46	24366101	Res, Carbon	100 J 1/6W
QX08	A6332430	Transistor	2SC2458-Y	RX47	24366101	Res, Carbon	100 J 1/6W
QX09	A6332430	Transistor	2SC2458-Y	RX48	24366101	Res, Carbon	100 J 1/6W
		- DIODES -		RX49	24366101	Res, Carbon	100 J 1/6W
						- MISCELLANEOUS -	

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
GX01	70113162	FIP	10-MT-35GK	
PX01A	23367716	Plug, 12P		
S204	23145248	Slide Switch, 2C3P		
SL02	23145394	Push Switch, 1C1P		
SL03	23344094	Push Switch		
SL05	23145394	Push Switch, 1C1P		
SL06	23344094	Push Switch		
SL07	23344094	Push Switch		
SL08	23344094	Push Switch		
SX15	23145394	Push Switch, 1C1P		
SX33	23145247	Slide Switch, 2C2P		
SX34	23145394	Push Switch, 1C1P		
SX35	23145247	Slide Switch, 2C2P		
SX36	23344149	Slide Switch	2C4P	
SX37	23145247	Slide Switch, 2C2P		
WX02	70178243	Wire	FFC, 13P, 110mm	
WX02A	23902364	Connector, FFC 13P		
XX01	23153744	Resonator, 5MHz, CSA5.00MG040		
XX02	23153860	Crystal, 32.768kHz		
ZR01	23120244	F.U.	IR-9101-D	
■UI07	70198860	P C Board Assy, ACE HEAD		
		- RESISTORS -		
R171	24366100	Res, Carbon	10	J 1/6W
■UI04	70188882	P C Board Assy	Mecha Base Sub	
		- TRANSISTORS -		
Q122	70114403	Transistor, Photo	PT493F	
Q151	A6090500	Hall Sensor	THS114	
		- MISCELLANEOUS -		
PI41	23902566	FPC, 6P		
SI25	23344089	Push Switch, 1C1P		
■UI05	70188881	P C Board Assy	Mecha Base Main	
		- INTEGRATED CIRCUITS -		
IC161	B0470212	IC	TC4021	
IC162	70128158	IC	BA10393	
		- TRANSISTORS -		
Q141	A6090500	Hall Sensor	THS114	
		- DIODES -		
D161	70115450	Diode, LED	GL451V	
		- CAPACITORS -		
CI61	24474103	Cap, Ceramic	0.01MF	N 16V
CI81	24474103	Cap, Ceramic	0.01MF	N 16V
CI82	24474103	Cap, Ceramic	0.01MF	N 16V
CI86	24474103	Cap, Ceramic	0.01MF	N 16V
CI87	24474103	Cap, Ceramic	0.01MF	N 16V
		- RESISTORS -		
R160	24366472	Res, Carbon	4.7K	J 1/6W
R161	24366472	Res, Carbon	4.7K	J 1/6W
R162	24366472	Res, Carbon	4.7K	J 1/6W
R163	24366472	Res, Carbon	4.7K	J 1/6W
R165	24366472	Res, Carbon	4.7K	J 1/6W
R166	24366273	Res, Carbon	27K	J 1/6W
R167	24366683	Res, Carbon	68K	J 1/6W
R168	24366472	Res, Carbon	4.7K	J 1/6W
R170	24366103	Res, Carbon	10K	J 1/6W
R171	24366103	Res, Carbon	10K	J 1/6W
R172	24366103	Res, Carbon	10K	J 1/6W
R173	24366103	Res, Carbon	10K	J 1/6W
R175	24366103	Res, Carbon	10K	J 1/6W
R176	24366103	Res, Carbon	10K	J 1/6W
R177	24366103	Res, Carbon	10K	J 1/6W
R178	24366103	Res, Carbon	10K	J 1/6W
R180	24366151	Res, Carbon	150	J 1/6W
R181	24366561	Res, Carbon	560	J 1/6W
R182	24366561	Res, Carbon	560	J 1/6W
R183	24366103	Res, Carbon	10K	J 1/6W
R184	24366334	Res, Carbon	330K	J 1/6W
R185	24366103	Res, Carbon	10K	J 1/6W
R186	24366334	Res, Carbon	330K	J 1/6W
R187	24366151	Res, Carbon	150	J 1/6W
R188	24366151	Res, Carbon	150	J 1/6W
R189	24366151	Res, Carbon	150	J 1/6W
		- MISCELLANEOUS -		

LOCATION NUMBER	PART NUMBER	DESCRIPTION		
PI51	23901261	Socket, 18P		
PI52	23902570	FPC, 10P		
PI53	23902566	FPC, 6P		
PI54	23902593	FPC, 5P		
WI21	70179392	Wire		
■UI08	70198858	P C Board Assy, LOADING M(T)		
■UI02	70198857	P C Board Assy, FL		
		- TRANSISTORS -		
Q121	70114404	Transistor, Photo	PT361F	
		- MISCELLANEOUS -		
SI22	70145382	FL Switch		
■UT01	70188621	P C Board Assy	Remocon	

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